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ABNORMALITIES OF THE MENOPAUSE

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ALTHOUGH common usage has given the term "menopause" a broader meaning, a proper definition should restrict it to the complete termination of the menstrual periods. Therefore, one should refer to the climacteric, which is defined as the period of aging which includes the total cessation of reproductive function, cessation of menses and regression of the genital organs. This is not an abrupt change but rather a gradual process which extends over a period of years, although the symptoms tend to reach a climax at the time of the menopause.

Albright, in considering the immediate factors active in bringing about normal menopause, looked to the hormone factors which control ovulation and the menstrual cycle and suggested that it was one of two possibilities: (*a*) a failure of the pituitary which directs the cyclic activity of the ovaries by means of the gonadotrophic hormones; or, (*b*) a failure of the ovaries to respond to the gonadotrophic hormones and, in the absence of developing Graafian follicles, a deficiency of the estrogenic hormone which stimulates the endometrial cycle.

In the following studies of the urine of women at various stages it was found that:

	Estrogenic Hormone	Gonadotrophic Hormone
Reproductive Period	+	0
Post Menopausal Period	0	+

From this, Albright concluded that it was a primary failure of the ovary and that the pituitary is producing either a relative or actual excess of gonadotrophic hormone which surpasses the renal threshold and as a result, appears in the urine. Therefore, the menopause is sometimes spoken of as "ovarian amenorrhoea."

It is likely that the majority of women pass through this period without symptoms and with a minimal amount of emotional distress; but there are a small number of women who experience symptoms of a degree which will bring them for medical advice.

AETIOLOGY OF SYMPTOMS

Although a great deal of work has been done on the factors producing these symptoms, principally in regard to the hormonal changes, and many useful facts have been established no all-inclusive theory has yet been evolved.

Albright felt that if the symptoms

were the result of hormone disturbances, then they would have to result from hypo-estronism or hypergonadotrophism or some unknown factor. Following experimentation he concluded that the symptoms were probably due to gonadotrophic excess because (*a*) estrogen concentration disappears before the symptoms appear; (*b*) estrogen concentration is re-established sometime before symptoms disappear; (*c*) hypo-estronism due to pituitary disease is not associated with symptoms; (*d*) symptoms occur in bursts suggestive of hypersecretion rather than sudden maintained absence; (*e*) many symptomless patients had no estrogen in the blood; (*f*) the curves of symptoms and hormonal blood levels rise and fall together; (*g*) the best response to treatment occurs in those whose gonadotrophic curves fall most rapidly with estrogens.

Fluhmann and Murphy showed that many post-menopausal women continue to have blood levels of estrogens in contradiction of Albright's findings and they suggested that (*a*) the estrogen is of extra-gonadal origin; (*b*) the ovary only activates the estrogen; (*c*) there is only one true ovarian hormone, and the hormones found after cessation of menstruation, are only accessory metabolic products. Their further investigations indicated that the association of gonadotrophic hormones and menopausal symptoms was not cause and effect, but the result of a third factor. They felt that the gonadotrophic hormone was not the underlying cause of these symptoms because they found that (*a*) a small quantity of estrogen which would not affect the gonadotrophic blood levels was sufficient to alleviate the symptoms; (*b*) some cases presented symptoms without an elevated gonadotrophic level; (*c*) menopausal symptoms were relieved without a fall of gonadotrophic level; (*d*) menopausal symptoms were not seen in cases of primary amenorrhoea with high gonadotrophic levels; (*e*) three cases with menopausal symptoms occurred secondarily to pituitary failure and its associated low gonadotrophic levels.

It is apparent that there is much conflicting evidence and opinion in this field; but Novak, in reviewing experimental work and in consideration of his own investigations, suggested that the underlying cause of these symptoms was an inbalance of the estrogen-gonadotrophic blood levels rather than an excess or deficiency of one or the other. This is the conception that is generally held today.

How does this disturbed hormonal balance produce symptoms? There appeared to be two centres upon which it may act: First, the basic mechanism of the mid-brain, affecting temperature regulation, vasomotor control, sugar and fat metabolism and general metabolic rate. Secondly, the pituitary, disturbing the rhythm of body reactions controlled by it and causing variations in activity of the growth hormone, and the adrenal, thyroid and reproductive endocrine glands. Thus, if we visualize the mid-brain and its respective functions and the pituitary with its net-work of endocrine glands, some of the possible symptoms will become apparent. The interrelationship between this hormonal balance and these two centres is not only evident at the menopause, but is apparent during puberty and the individual menstrual cycles by changes in the basal metabolic rate, blood pressure, temperature, etc. On the basis of this theory, one would expect to see menopausal symptoms more commonly and of greater severity in the artificial menopause and such has been the case.

Before we venture too far into the uncharted seas of the endocrine, strewn

as it is with the wrecks of so many hypotheses, it would be best to take cognizance of the potent extrahormonal factors which may be influencing the situation. These are principally the psychic disturbances. Some women have fears which develop into phobias due to ignorance and subsequent dread of the outcome of the menopause. Sociologic conflicts in the home, marital disharmony, parental difficulties and financial reverses all serve to accentuate symptoms of this period. Social overactivity, over-indulgence in stimulants and inadequate rest all serve to undermine the general health and predispose symptoms. Then, there are a group fearing to lose their husband's attention who will use their minimal symptoms as a plea for this supposed failing of affection.

Finally, in considering this problem, one must remember that only a minority experience any symptoms and well-adjusted healthy women rarely have many complaints.

There are a great variety of symptoms observed during this period. Some of these are obviously the direct result of the menopause while the relation of the others is still a matter of conjecture. But since they all may appear during this period, their consideration here would seem warranted and an attempt to understand their relation to the menopause useful in order that rational treatment may be employed.

UTERINE BLEEDING

There are two periods when this is evident during the climacteric. First, during the period of gradual cessation of menstruation when any excessive or prolonged menstrual flow or inter-menstrual bleeding must be considered abnormal; and secondly, when there is a return of bleeding some time after the cessation of menstruation.

Investigation of bleeding will be carried out with the consideration of three possibilities: (1) That it is associated with an acute or chronic constitutional disease; (2) The possibility of a local organic lesion; (3) That it is functional bleeding and the result of a hormonal disturbance.

1. Constitutional Disease. This is not a common cause and is more commonly associated with amenorrhoea but should always be kept in mind.

2. Local Organic Lesions. These may be divided into benign and malignant. It has been found in this period that approximately 50 percent of cases of bleeding from the genital tract was the result of malignant disease. Pemberton and Lockwood in a series of 596 cases found 303 due to malignancies. TeLinde in 179 cases found 60 percent due to malignancy somewhere in the genital tract while Geist and Matur in 182 cases found 57 percent of malignant origin. Noyes in a series of 415 women over 40 years of age with symptoms of abnormal bleeding, found that the incidence of carcinoma rose rapidly in each decade after 40 and that it was much greater after menopause than before in each decade. On the basis of this series, he stated that a 60-year old woman still menstruating is no more likely to have carcinoma than a postmenopausal 40-year old. This latter statement has been confirmed elsewhere, and therefore, it would seem as though the change at the menopause is a more important factor than age as to the probable cause of bleeding.

The site of the malignancy varies in frequency, some finding carcinoma of the cervix twice as common as carcinoma of the body of the uterus; but in a series by Geist and Matus, there were 37

cases of carcinoma of the cervix, 41 cases of carcinoma of the body of the uterus and 12 cases of carcinoma of the ovary, with bleeding becoming apparent anywhere up to 14 years following menopause with a palpable tumour in every case but one.

Numerous benign lesions have often been associated with genital tract bleeding. The most frequently encountered are cervical and uterine polyps. Benign ovarian tumours, submucous fibroids, adenomyosis, endometritis and post-menopausal vaginitis have also accounted for bleeding which may vary from slight spotting to profuse haemorrhage.

3. Hormonal Disturbances. Frequently, on curettage, one finds a hyperplastic endometrium but this is not constant. Some of these are due to anovulatory cycles with estrogen levels similar to those found by Fluhmann and Murphy in their investigations. A few may be accounted for by withdrawal of estrogen therapy, but the remainder are due to more obscure causes for which there have been numerous suggestions such as deficiency of uterine muscle, failure of the spiral arteriolar apparatus and disturbance of vasomotor nerve supply and the possibility of action of other ductless glands.

VASOMOTOR DISTURBANCES

The commonest symptoms experienced during the menopause are the products of disturbed vasomotor control. The hot flush, which is a flush associated with the sensation of heat which passes down over the face, neck and upper thorax, is the most frequent manifestation. These are sometimes followed by a sweat which in turn may be terminated by a chill. Although the patient may not be seriously perturbed by the flushing, the repeated sweats may be very distressing. A third, but relatively uncommon, manifestation is the hot flash characterized by a sensation of heat throughout the whole body without any flushing or perspiration. The frequency and severity of these symptoms are highly variable but only a few experience them to a severe degree.

There are some other symptoms where the association of vasomotor disturbance is rather controversial. A few patients exhibit gastro-intestinal spasticity with mucous colitis; others have an increase or accentuation of migraine headaches with nausea and ocular disturbances. Cushman, by studying the visual fields of these patients, suggested that there was a pituitary disturbance in some, and that this might be a factor in the production of these headaches.

GENITAL TRACT

Another site where post-menopausal changes may be observed is in the genital tract itself.

1. Leukoplakia Vulvae. This is an atrophy of the vulva due to changes of the epithelial or sub-epithelial elements. The underlying cause is not well understood and although estrogen deficiency has been postulated, the results of estrogen therapy have been singularly disappointing.

Hamblin has postulated that the increased androgen output which has been found in association with menopause and its associated defeminizing effect may have a greater influence than estrogen lack in producing regressive changes but this too seems to be still in the field of speculation.

This process appears to fall into three distinct phases. At first, the skin and mucosa appear swollen and red, and on section there is evidence of pronounced acanthosis and keratosis with infiltration of the submucosa by round cells and leukocytes. During the second stage,

which usually extends over a period of a year, the skin and mucosa appear firm, white and frequently excoriated due to scratching. On section, again we have the acanthosis and heaping up of the keratin while the submucosa reveals an infiltration of round cells and plasma cells with proliferation of collagenous tissue. Finally, the labia majora becomes flattened out, the labia minora completely disappears, clitoris and prepuce shrunken and the vulvar orifice is contracted until in some cases it will admit only one finger. The skin is now as thin as parchment, a pearly white colour, dried, and cracks easily. On section, the epithelial layer is thin and the papillary processes are gone; the submucosa is replaced by dense collagenous tissue with islands of round cells. The elastic tissue stain will reveal the elastic tissue greatly reduced in amount, and the remainder broken into small bunches. This degenerative process may be localized to one area, involve only one side, or extend over the whole vulva. The patient's presenting complaints are usually pruritis and dyspareunia with or without urinary frequency and dysuria.

Is this a predisposing factor to carcinoma? Carcinoma of the vulva makes up approximately 4 percent of cases of carcinoma of the genital tract, and Taussig, in a review of 76 cases, found that 39 (50 percent) had developed upon a leukoplacic degeneration, 60 percent in the early stages and 40 percent in the late atrophic stage. In consideration of the relative infrequency of leukoplakia, it would thus appear to be a definite factor.

2. Senile Vaginitis. The second change in the genital tract is postmenopausal or senile vaginitis with or without infection. The cause of this disturbance is again not too well defined. Under normal conditions estrogen causes proliferation of the lining epithelial and glycogen deposition. Bacteria and enzymes lead to breakdown of glycogen to lactic acid which favours the growth of the lacto-bacillus of Doderleirs. This results in a normal PH between 4.0 and 5.0 which serves to protect the vagina from exogenous infection. With a decrease of estrogen, there is a thinning of the epithilium, reduced acidity and disappearance of the lactobacillus; and thus permits an invasion of pathogeric organisms. But then, one finds that it requires very little estrogen to maintain a normal mucosa, and some of these cases have an essentially normal epithelial lining. The causative agent is not constant but Streptococci, fungi, and Trichimonis vaginalis have been suspected in different cases.

The patient will complain of dyspareunia, tenderness and pruritus associated with an offensive yellow discharge. On inspection with a speculum one will observe a smooth pale mucosa studded with reddened areas of erosion typical of senile vaginitis. In the presence of infection, there will be a mucopurulent discharge; a hanging drop study of this may reveal the trichimonis vaginalis. A smear of the vaginal cells tends to be very variable; but a picture of many flat squamous cells is suggestive of vaginitis. A study of the bacteriology is not decisive. Although the normal Doderleins bacillus is replaced by a mixed culture, this may be the result of vaginitis, but is sometimes found in the normal post-menopausal stage. Thus, some feel that the only way of establishing a diagnosis is by means of biopsy. This presents a typical picture of patchy desquamation of epithelium with intervening areas of normal mucosa. In the bases of these desquamated areas there is an extensive infiltration of round cells and plasma cells.

The general regressive process may occasionally extend to involve the urethra and cervix. The urethra may become tube-like with the subsequent development of incontinence and frequency. The cervix may occasionally become narrowed and occluded and with the collection of any intra-uterine secretions may result in the formation of a pyometra. The further weakening of the perineal tissues damaged during labour may serve as the precipitating factor in production of prolapse of the genital organs and appearance of cystocele, rectocele and enterococele in the vagina.

MENOPAUSAL ARTHRALGIA AND ARTHRITIS

There has been a great deal of controversy as to the relation and nature of this condition; but it is now largely accepted as a manifestation of disturbances of the menopause. These cases may be classified in three groups:

1. Arthralgia.
2. Arthralgia plus swelling of the tissues about the joints with stiffness and pain on motion.
3. Arthralgia with sudden development of hypertrophic changes in the joints.

These patients present a characteristic history. They are frequently following an artificially induced menopause. There has been no joint disturbance before the menopause, with the onset usually three weeks following operation, and this tends to be their principal symptom. The physical examination is otherwise negative, the sedimentation rate frequently normal and there is no apparent explanation of the joint symptoms. Finally, in many cases following estrogen therapy, there is considerable and occasionally dramatic relief. In one series presented by F. C. Hall of Boston, in 71 cases of artificial menopause, there were 53 cases of arthralgia without evidence of pathological change, of which 70 percent were relieved by estrogen therapy and the remainder to a lesser degree. The remaining 18 manifested evidence of one or other type of arthritis as well as the arthralgia; and in these cases the estrogen therapy appeared to relieve the arthralgia, and at least arrest the arthritic process.

Those who argue against this being a true manifestation of the menopause suggest that this is just a coincidental association of the arthritic symptoms and claim as good result with general treatment such as physical therapy, diet, weight reduction, etc. The lack of uniformity of the type of arthritis would also suggest that there is not a direct cause and effect relation.

THYROTOXICOSIS

A problem of differential diagnosis which will sometimes present itself is the menopausal patient with symptoms closely allied to those of thyrotoxicosis. The normal menstruation may have become irregular or absent for a period of months. They may or may not have a goitre of long standing. Increased weakness, fatigue and nervousness are manifested. Increased heat sensitivity and sweating, dyspnoea and palpitation, tremors and weight loss may have been experienced and an increase in pulse rate may be observed. Some of these cases may be very difficult but there are a number of suggestive factors. First of all, when these symptoms appear in a woman over 40 years of age with an apparent change of menstrual history, then one should seriously consider that it is not a true thyrotoxic state, but remembering that both before and after 40, thyrotoxicosis may produce a disturbance of menstrual function. A very

useful qualitative difference in regard to heat sensitivity is seen in the menopausal syndrome. Here one finds that heat intolerance is associated with hot flushes with relief following subsequent sweating. A persistently high metabolic rate in a woman is very suggestive of thyrotoxicosis while a slight to moderate elevation, which is associated with considerable variability, suggests the instability of a menopausal disturbance. Finally, a therapeutic trial of estrogen therapy may serve to settle the diagnosis.

HYPERTENSION

Again, one finds conflicting evidence and opinion as to the relation of the onset of hypertension and changes of the menopause. In 1936, Schaeffer presented 13 cases of gradually increasing hypertensive states which, if allowed to continue, would, in his opinion, have resulted in permanent hypertension. All these cases presented other symptoms of the menopause and an average blood pressure before treatment of systolic: 200, diastolic: 115. Estrogen therapy was carried out for a period averaging 1.8 years and the resulting blood pressure was systolic: 149, diastolic: 84.

On the basis of these cases, he concluded that the hormone disturbances of the menopause could serve to initiate the hypertensive state and accentuate one already present.

Taylor, Corcoran and Page, however, in a study of hypertension in 200 cases of normal and 179 cases of artificial menopause, found only 13 percent had blood pressures over 149/94. This figure may be compared to the figure of 14.9 percent which was the percentage of normal workers found with elevated blood pressures in a large series by the Heart Council of Greater Cincinnati. Ten percent of these hypertensive women had evidence of elevated blood pressure before the onset of the menopause, and there was no change subsequent to the menopause. Thus, only three percent revealed an elevated blood pressure with the menopause and they all tended to be emotionally unstable individuals in whom no constant blood pressure readings could be obtained. Estrogen therapy resulted in only slight reductions of blood pressure levels and equal improvement was seen in cases placed on a placebo and psycho-therapy. On the basis of this, they felt that the relation of hypertension and menopause was purely coincidental.

DIABETES

There are a few cases of diabetes which become apparent during the period of the menopause. Gitlow and Kurschner on the basis of experimental work in which diabetes was produced by an excessive administration of an extract of the anterior lobe of the pituitary with the resulting atrophy of the islets of Langerhans, postulated that a similar process could be active during the period of menopause. They suggested that, during the period of regression of estrogen activity and the associated hyperactivity of the pituitary (which would include the diabetogenic factor) if the hyaline and hydropic degeneration of the islets was extensive enough, a diabetic state or an exacerbation of a previous diabetic state could be produced.

On this basis, they applied estrogen therapy to four limited groups:

1. Coincidental onset of diabetes of the menopause — 8 patients
2. Exacerbation of diabetes at the menopause — 2 patients
3. Diabetes long after the menopause — 3 patients

4. Diabetes with menopausal symptoms 2 patients

They found that all those of the first two groups improved and that this improvement corresponded with the disappearance of the menopausal symptoms. The improvement was accompanied by a reduced requirement of insulin until all were carried on without it. Hormone therapy in the latter two groups was ineffective in every case.

Although this series is small, and this situation is relatively infrequent, it is at least suggestive that the hormonal imbalance plays some part in the productior of the diabetic state; and, therefore, consideration of estrogen therapy would be rational in this type of case.

DERMATOSIS

The principal advocate of the relation of the hormonal changes of the menopause and its skin manifestations is Barber in England. He designated certain areas which he called the menopausal areas: (*a*) The pubic region and groin; (*b*) The areola of the nipple, the sub-mammary folds and the axillae; (*c*) The ante-cubital fossa and nape of the neck; (*d*) The eyelids and the rosaceous areas of the face.

Some of the commoner menopausal skin manifestations are:

1. HYPERTROPHIES. These lesions are all limited to the post-menopausal period and their association appears to be well established.

   a. PAPILLOMATOSES are those pedunculated filiform tags, usually skin colour although sometimes darker, which are so commonly seen in patients of this age on the lateral and anterior aspect of the neck as well as the other menopausal areas.

   b. VERRUCAE SENILIS or seborrhoeic warts are the pale yellow areas of hyperkeratosis which tend to darken with age until almost black. These are not pre-cancerous lesions but Barber states the estrogen therapy is very useful in cases where these are numerous and disfiguring.

   c. HYPERKERATOSES, includes diffuse hyperkeratosis and Palmar and Plantar keratoderma. Palmar and Plantar keratoderma, although quite rare, have proven very responsive to estrogen therapy. The lesions are diffuse hyperkeratotic plaques on an erythematous base which tends to progressively thicken and fissure with severe burning and itching, particularly at night. This is very distressing and relief is appreciated by both the patient and physician.

2. INCREASED SEBACEOUS ACTIVITY.

   a. PITYRIASIS CAPITIS

   b. SEBORRHOEIC DERMATITIS

   c. ACNE ROSACEA

Barber presents the theory that activity of the sebaceous glands is the product of the hormonal balance of the androgens and estrogens. In practice, this is suggested by the frequent history of acne, pityriasis capitis and seborrhoeic dermatitis which clears following adolescense to reappear again following the menopause. A common history in these post-menopausal patients is increasing pityriasis capitis, loss of hair and development of an acute dermatitis in the retro-auricular region which may also appear in the other menopausal areas. Others may present a combination of pityriasis and acne rosacea and in these cases Barber has observed definite improvement with estrogen therapy. There are a number of other conditions which he presents as associated with the

changes of the menopause but the relation is not striking and there appears to be a lack of confirmation from other investigators.

PSYCHOLOGICAL CHANGES

There have been observed in some cases abrupt changes of personality and temperament—the simple, sweet, little lady has become aggressive and domineering while the masculine type of woman has become sensitive and kindly. This is not common, with the great majority showing very little change, and why it does occur cannot be explained.

In the older literature there was a great deal of controversy as to the etiological relation of the menopausal changes to true psychosis; but since 1940 when a well conducted series in a New York Hospital failed to show any relation between the two conditions there has been a great deal of clinical observation to confirm this latter view, and it is now generally accepted that there is no mental state which is the product of the changes of the menopause.

There are cases of major psychosis who will show an exacerbation at this stage. Another group as a result of ignorance and unfounded fears will produce an accentuation of their menopausal symptoms or a mild degree of reactive depression. This latter state will invariably clear with explanation, discussion of their condition and recession of their symptoms. There are many factors which tend to produce emotional unrest unless the patient has a proper understanding of the significance of the menopausal period. Some of the common fears which these people express are an undue awareness of advancing years, fear of serious disease, worry of economic insecurity and a sense of apprehensiveness that their husband is tiring of them. In the case of those who have experienced hardship or ill health and have lost the interests of early married life such as a family circle, with none to replace them, pass into a period of monotony and introspection when these fears may become major problems.

TREATMENT

Thorough investigation of all presenting symptoms is a prerequisite in order to eliminate any possible organic cause. Following this, an explanation of the basis of symptoms and reassurance as to the eventual outcome is often all that is required to tide patients over this period.

A number of general measures can be taken if the situation warrants. Avoidance of overwork and undue fatigue, correction of faulty diet, obesity, anaemia, reduction of excessive smoking and prevention of constipation will do much to improve the patient's sense of well-being.

Finally, hormonal therapy is indicated in a limited group to relieve symptoms during this transitional period. Estrogen therapy has proven valuable in cases of vasomotor upset and in senile vaginitis; it sometimes relieves arthralgia and occasionally it is useful as a therapeutic test in severe headaches. Obviously, estrogen therapy should not be used before an adequate examination has been done. Its use is contra indicated in the presence of cancer or following radiation of benign uterine hemorrhage or malignant tumour.

SUMMARY

The aetiology and treatment of menopausal symptoms are briefly outlined. Uterine bleeding, vasomotor disturbances, genital tract changes, arthralgia and arthritis, thyrotoxicosis, hypertension, diabetes, dermatosis and psychological changes occurring at the menopause are discussed.

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TESTS FOR PULMONARY FUNCTION

IRWIN M. HILLIARD, B.A., M.D., F.R.C.P.(C)*

It is only natural in this age, "the gadget age," when efforts are being made to support clinical observations by laboratory tests, that considerable work is being done to standardize the group of tests which will measure accurately pulmonary efficiency. In the amoeba, respiration is simply the passage of oxygen into the cell and of carbon dioxide out of the cell. In the human, the same process is acting through the lining of the alveoli, which we might call the respiratory membrane; but there s the additional process of carrying the oxygen to this membrane and of transporting it from the membrane to the rest of the cells of the body and of getting rid of the carbon dioxide in the reverse direction. There are also the special cells which regulate respiration—the respiratory centre, which is at some distance from the respiratory membrane and therefore affected by the efficiency of the transport system (circulation), and it is also affected by stimuli from many other areas of the body.

The subjective evidence of pulmonary inefficiency is dyspnoea. This is defined as the consciousness of some increase or of some difficulty in breathing and it may be due to a variation or breakdown in any of the factors controlling respiration as well as failure in the transfer of oxygen and carbon dioxide through the respiratory membrane. A determined effort is being made to design tests to differentiate the causes of pulmonary failure and to correlate them with clinical observation. The patients at Toronto Western Hospital, who had one lobe or one lung removed surgically or the chest opened for various pathological conditions, were examined and tested several months postoperatively. Two facts became obvious. The first was that the patient's viewpoint was of the greatest significance; one patient, who had had an open drainage of a haemothorax, felt he had not been adequately compensated by his company—he did very poorly in many of the tests and had a much greater disability than a patient who had had one lung removed and who was the mother of two small children—she ran up and down two flights of stairs at a bakery without difficulty, in the support of her children. The second fact was that the history was the most accurate test for small changes in pulmonary efficiency. A careful history would indicate how far the patient's psychology was affecting his symptoms and it also showed changes in habits, such as stopping competitive sports for ordinary ones, decreasing the rate of effort as well as the duration and gave other indications of how pulmonary efficiency had been affected. The patient might be unaware of the change or, because he felt better postoperatively, might think that his pulmonary efficiency was improved. The history, too, would indicate how far "conditioning" had played a part in alteration in pulmonary efficiency, something which no set of tests could disclose.

FACTORS AFFECTING RESPIRATION

Changes in pulmonary efficiency should be considered in terms of the different factors affecting respiration. These are

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grouped below and, although no attempt has been made to include definite pathological conditions as examples in each case, it is an interesting recreation to do so; certain conditions will be found to affect more than one function.

1. VENTILATORY
   - (*a*) *Abnormal Inspired Air*
     - (i) Low oxygen
     - (ii) High CO_2
     - (iii) Other gases
   - (*b*) *Abnormal Conditions of Respiratory Centre* (control mechanism)
     - (i) Depression—drugs *e.g.*, morphia
     - (ii) Damage—toxins
     - (iii) Stimulation—poisons (exogenous—drugs; endogenous—added CO^2; acetone bodies)
     - (iv) Increased irritability—pressure i.e., increased intracranial pressure, mild anoxia
   - (*c*) *Obstruction to Easy Passage of Air*
     - (i) Nasal
     - (ii) Pharyngeal
     - (iii) Tracheal
     - (iv) Bronchial—spasm, thick secretion, mucous plugs
   - (*d*) *Abnormal Mechanics*
     - (i) Muscles—weak, painful, fibrosed
     - (ii) Nerves—paralysis of intercostal or phrenic nn.
     - (iii) Joints—painful or ankylosed costovertebral joints
     - (iv) Other tissues—thickened pleura
     - (v) Loss of elasticity of lungs
     - (vi) Obstruction to normal movements—abdominal distention

2. RESPIRATORY
   - (*a*) *Inadequate Respiratory Membrane*
     - (i) Removal of a lung or part of it
     - (ii) Collapse or fibrosis
     - (iii) Air or fluid in pleural cavities
   - (*b*) *Damaged or Altered Respiratory Membrane*
     - (i) Fluid in alveoli
     - (ii) Congested membrane
     - (iii) Membrane damaged by toxins or noxious gases
     - (iv) Degeneration—emphysema

3. CIRCULATORY
   - (*a*) *Decreased Oxygen-Carrying Capacity*
     - *e.g.* Anaemia
   - (*b*) *Increased Viscosity of the Blood*
     - *e.g.* Polycythaemia
   - (*c*) *Slowed Circulation*
     - *e.g.* Congestion—as in heart disease
   - (*d*) *Arterio-Venous Shunt*
     - (i) Congenital heart disease
     - (ii) Arterio-venous fistula

Some of the laboratory tests which we use for other conditions could be applied in the investigation of some of these abnormal conditions which cause dyspnoea, for example—we seldom analyze inspired air, except for experimental purposes or in aviation medicine. However, when oxygen therapy is being used, it is now routine precaution to check the oxygen content of the inspired air at regular intervals, for it is very disconcerting to find that the patient has been breathing air with an oxygen content very little higher than that of the room air and this sometimes occurs if checks are not made. A Beckman oxygen analyzer may be used for this; it is a simple, handy instrument into which the gas is sucked by a rubber bulb and a reading taken on a dial when a button is pressed. The principle involved is

that, of all the gases, oxygen has by far the greatest magnetic field and a battery current, passing through gas between two electrodes, causes two magnetized balls to swing in proportion to the amount of oxygen in the sample.

Investigation of substances in the blood, which might affect the respiratory centre, are routinely done in diabetic acidosis (CO_2 Combining Power) and uremia (N.P.N. and Creatinine). Although pulmonary efficiency is not impaired, the patient's dyspnoea is often very distressing and very obvious, such as the Kussmaul's type of breathing in diabetic acidosis.

TESTS OF MECHANICS OF RESPIRATION

1. Vital Capacity. The determination of vital capacity is relatively very simple and gives some idea of the mechanics of respiration as well as the amount of functioning lung; this is the amount of air which a patient can blow out of his lungs with a full expiration after a full inspiration The weakness in this is that it depends largely on the patient's cooperation and it does not differentiate the variety of causes which may give lowered pulmonary efficiency, such as weak muscles, ankylosed rib joints, partly fibrosed, collapsed or congested lung. However, combined with other tests, it affords a rough measurement and may be used to show changes as a patient's condition improves or gets worse.

2. Maximum Ventilatory Capacity. An interesting modification of the vital capacity test, which gives an even better measurement of the mechanical efficiency, is the maximum ventilatory capacity, using the flow meter or gasometer. The total amount of air which can be breathed in a minute is recorded, the rate and depth of expiration being chosen by the patient. Here, again, the patient's cooperation is most essential and the sick patient is less able to cooperate, even if he is anxious to do so.

3. Excursion of Diaphragm and Lung Borders. Measurements of chest expansion are of little practical value, but measurements of the excursion of the diaphragm and lung borders on the two sides is of very great value, particularly in cases of emphysema, diaphragmatic adhesion, collapse and localized fibrosis. These measurements can be confirmed by fluoroscope and recorded on paper with an orthodiascope, but careful physical examination is much easier at the bedside of a sick patient and, with persistent striving for accuracy, physical examination is equally reliable.

TESTS OF CIRCULATORY FUNCTIONS

Changes in the blood which affect respiration can be easily detected by haemoglobin and haematocrit determinations. Anaemia or polycythaemia both will affect the ease of production of dyspnoea. Two valuable simple tests of the efficiency of circulation are (*a*) the measurement of venous pressure and (*b*) the determination of circulation time. These are very helpful in assessing the degree of congestive failure which may be playing a part in the production of dyspnoea.

There still remains the great difficulty of determining in a patient with dyspnoea how much is due to purely pulmonary insufficiency and how much to cardiac incompetence. History of past illnesses, presence of respiratory symptoms, cough, sputum, pain in the chest; and the absence of cardiac symptoms, peripheral oedema, symptoms due to a congested liver, cardiac pain on effort—

these must all be carefully elicited and evaluated. Careful examination of the chest, with regard to abnormal mechanics, obstruction in the air passages, amount and health of the lung tissue, may be weighed against evidence of cardiac disease, enlarged heart and presence of significant murmurs. Frequently, in the older patient, there is an element of both cardiac and pulmonary insufficiency producing their symptoms.

TESTS OF RESPIRATORY FUNCTION

1. Air Oxygen Difference. It has always been felt that, if we could watch the oxygen content of the aerated blood coming from the lungs in various conditions, we would have an exact measurement of pulmonary function. We know now that change in arterial oxygen content, even with strenuous exercise, occurs only in advanced disease and, therefore, is a very gross test. However, there is recently available an instrument which records the oxygen content of the blood passing through the pinna of the ear and, if the ear is warmed so that the capillaries are dilated, the blood will pass through fast enough to have had little oxygen removed and it will be comparable to arterial blood. This instrument is called an oximeter. Unfortunately, because it does such complicated determinations so easily, too great confidence has been placed on its reading; not sufficient account is taken of the effect on straining, turning the neck or increasing venous pressure in various ways. If care is taken to insure the rapid blood flow through the ear, it is possible to study the difference in arterial oxygen saturation under various conditions. The simplest comparison is when the patient is breathing air and when he is breathing oxygen. This difference is not affected by the cooperation of the patient and can be done on sick patients who are in bed. However, there must be considerable loss of efficiency before there is a significant difference.

2. Changes in Arterial Oxygen with Exercise. Another test is to measure the change in arterial oxygen with exercise. Normally arterial oxygen is 95-98% saturated and does not change with exercise. In a few cases there may even be improvement due to faster circulation and better aeration of the lung bases There is a fall of arterial oxygen saturation when there is an arterio-venous shunt as in arterio-venous fistula or in some cases of congenital heart disease. In most cases of pulmonary disease where a change would be expected the patient tires out in either his skeletal muscles or respiratory muscles before there is any significant fall and marked dyspnoea has been very obvious. *In other words dyspnoea is the best test for pulmonary efficiency and the amount of effort required to bring it on is the best measure.*

SUMMARY

In summary, I would remind you that the newer laboratory methods of testing pulmonary efficiency are all subjected to certain errors and, although they have a quantitative reading, none of them will show up minor changes in pulmonary efficiency nor differentiate the cause. A complete history and a careful physical examination, however, will do it.

ANKYLOSING SPONDYLITIS

R. GORDON BREMNER, 5T0

ANKYLOSING SPONDYLITIS may be one of the most crippling of chronic progressive diseases of the spine. The fundamental lesions occur in the synovial joints; i.e., sacro-iliac, small posterior intervertebral and costovertebral joints.

Numerous names for the disease have appeared in the literature, and there is no doubt that the lack of uniform terminology has fostered widespread confusion. The name rheumatoid spondylitis is the one adopted by the American Rheumatism Association. Other synonyms are Marie-Strümpell disease, spondylitis deformans, spondylitis rhizomelica, spondylitis ossificans ligamentosa of Knaggs, rheumatoid arthritis of the spine, spondylarthritis and von Bechterew's syndrome.

INCIDENCE

Of one thousand new "run-of-the-mill" civilian patients, less than one per cent were diagnosed as ankylosing spondylitis, but in military personnel, this rose to 5.7 per cent.[1] It is a disease primarily of the male sex, the ratio of males to females affected varying 10 to 20 : 1.[2, 3]

The onset of symptoms occurs in the third decade of life in approximately 70 per cent of patients, with the remainder divided equally between the fourth decade and the latter part of the second decade.[4] The average age of onset is 24 years. However, the duration of time before the diagnosis averaged 5.7 years.[5]

The disease is not as uncommon as previously supposed. In a recent study, 18 per cent of patients admitted to an army hospital with chronic back complaints were found to have this disease.[4] This high incidence among soldiers may be explained by the preponderance of young males in the army, and the influence of physical activity and military living conditions in bringing early cases to light.

Whether the disease is really an involvement of the spine by rheumatoid arthritis or a separate entity remains a matter of dispute. Earlier figures varied from 1 case of spondylitis to every 11 to 16 cases of peripheral rheumatoid arthritis.[6, 7] But more recent reports have changed the ratio from 1 case of spondylitis to 2.8 to 3 cases of peripheral arthritis.[4, 5]

Argument that the two are separate diseases is based on the following facts: different sex incidence and age groups; no subcutaneous nodules in spondylitis but a higher incidence of iritis;[8, 9] ligamentous calcification of late stage spondylitis which is not a feature of peripheral joint involvement; absence or low concentration of streptococcal agglutinins in most spondylitis cases;[10] roentgen therapy of no value in peripheral arthritis and chrysotherapy ineffective in rheumatoid spondylitis. On the other hand the sedimentation rate is elevated in both types and it is said that the diseases frequently co-exist with identical pathological reactions in the joints.

PRECIPITATING FACTORS

The aetiology of ankylosing spondylitis is not known and in the majority of cases no precipitating cause was found. A few patients dated first symptoms to minor back injury or acute gonorrheal

urethritis, but both of these factors may have been aggravating or "trigger" mechanisms, bringing the disease to light symptomatically. Some others suggested unusual exposure to cold, wet weather or preceding infection.[11]

CLINICAL PICTURE

The onset of the disease is insidious. This explains the early difficulty in recognition. In 82 per cent the first complaint is back pain.[5] Mistaken diagnoses have included lumbago, fibrositis, low back strain, idiopathic sciatica, ruptured disk, herniated fat, adolescent kyphosis, osteoarthritis, psychoneurosis and malingering.

Pain, the major complaint, is usually localized to the lower back but may be referred farther up the spine. Occasionally it radiates along the sciatic nerve, but is seldom noted below the knee and often alternates from side to side. Other routes of radiation are girdle pains around chest and trunk. The episodes of aching, or even sharp, stabbing pain aggravated by jolting or coughing, last a few days and then subside completely; these exacerbations and remissions are featured in the course of three-quarters of the cases.[2] As the disease progresses, the pain tends to become a constant dull discomfort described as a "deep ache" or "tired feeling," very often more severe during the night.[12]

Another feature is stiffness of the lower back, especially on waking, which may take hours to work off. This stiffness often progresses upwards and involves even peripheral joints, but the process may become arrested at any point, and spinal deformity may not develop even in cases showing complete "poker rigidity." Reduced mobility is noted in the lumbar segment in 96 per cent of cases, and in the cervical segment in 56 per cent.[5] Impairment of forward flexion is noted, with the average patient in one series only reaching to within sixteen inches of the floor.[13] In 70 per cent, chest expansion is reduced to less than one and a half inches.[5]

In advanced cases of the disease the patient presents an abnormal posture and a rigid, anthropoid gait. There is a flattening of the normal lumbar curve, accompanied by spasm of the paravertebral muscles and spinal tenderness. Some show a dorsal kyphosis and, less commonly, scoliosis, with a thoracic stoop and forward protrusion of the neck. Also the thorax may be fixed in a position of expiration and the chest flattened with reduced vital lung capacity.

Involvement of peripheral joints by arthritis is observed in about a quarter of spondylitis cases, the knees and hips being most frequently involved. Swelling of other joints was noted in 18 to 36 per cent of cases in different series.[2, 4, 14]

Constitutional symptoms include weakness, fatigue, anorexia and weight loss. Muscle wasting does not occur until the disease is well-advanced, and may be due to disuse rather than to trophic wasting as occurs in rheumatoid arthritis.[15] Insomnia, discouragement, frustration and depression often occur. Other occasional systemic findings include low-grade pyrexia, slight leucocytosis, secondary anemia of moderate degree and elevation of the erythrocyte sedimentation rate. The sedimentation rate is a fairly consistent gauge of the disease's activity, and is over 20 mm. in 80 per cent of cases when measured by the Westergren method.[8]

Roentgenological findings are characteristic when present, reflecting the pathological changes in the true diarthrodial joints of the spine. X-ray alterations of the synovial joints result from destruction of articular cartilage and changes in subchondral bone, but

synovitis may be present for months or years before cartilage or bone changes can be seen. The later ankylosis and calcification of paravertebral ligaments is unexplained.

It is generally accepted that the disease begins in the sacro-iliac joints, with the earliest radiological changes consisting of a blurred ground-glass appearance of the normally well-defined joint borders due to marginal decalcification. In the joint area, the ilium and sacrum may show pyknotic zones of increased density, mottled zones of osteoporosis, or both. These changes vary directly with the severity and duration of the disease, but eventually the joint space is narrowed and ankylosis occurs, usually bilaterally.[8]

The importance of radiological evidence of involvement of the posterior intervertebral or apophyseal joints has been questioned and although some workers believe that oblique x-ray films of these facet joints are essential, most observers consider that the changes are indefinite and inconstant.[4] Qualitatively, the changes are similar to those noted in the sacro-iliac joints.

Usually changes in the paraspinal ligaments are not noted until the disease is well-advanced. Calcification and ossification vary in degree from fine "pencil" lines to heavy "bambooing," and usually commence in the lower thoracic and upper lumbar portions of the spine.

DIAGNOSIS

When the foregoing clinical picture is advanced, the diagnosis of ankylosing spondylitis is not difficult. Early diagnosis of the disease is however most important, for prompt institution of therapy gives by far the most beneficial results.

"Ankylosing spondylitis should be suspected in young adult males, complaining of stiffness and back pain with reduced spinal mobility and an increased erythrocyte sedimentation rate. The finding of bilateral sacro-iliac arthritis on x-ray examination confirms the diagnosis."[5]

TREATMENT

"Treatment for rheumatic disease has not evolved into a routine procedure that has met with complete or even general agreement among those responsible for management of this group of illnesses."[16] Present-day treatment for ankylosing spondylitis is directed towards relief of pain, correction of deformities and rehabilitation of the patient, and may be divided into general, x-ray and physical therapy.

General treatment includes bed-rest proportional to the activity of the disease. The back may be strengthened and supported by a thin mattress over fracture boards with a small pillow in the lumbar hollow to hyperextend the spine. It is generally recommended that the diet should be high in caloric intake and vitamin content. Although concentrated vitamin D has been suggested by some workers, it is not used by most.[8, 17] And of course, the patient should receive a satisfactory explanation of his chronic condition, in order to dispel his apprehension and to restore his morale, which also can be raised by exercises and occupational therapy.

X-ray therapy was first stressed by Scott in England and Kalmeter in Sweden, and now is recommended on an empirical basis by most observers.[16] Given early in the disease, x-ray, in 92 per cent of cases, provides some relief from pain and lessens all clinical evidence of the condition; even previously clouded joint spaces have again become clearly defined.[18] Results depend not only upon irradiation of the spine and

its joints and ligaments, but also upon irradiation of the back muscles and their attachments.[16] However, if there is late stage ankylosis and calcification, there will be no significant objective benefit.[16] In one series, the psychotherapeutic effect of the roentgen radiation treatment was checked by using lead plates to block the x-rays, and it was found that, without this shield, improvement was objective as well as subjective.

Some radiologists prefer wide-field scattered x-radiation using 130-140 kv., but most use concentrated local x-radiation given as 180-200 kv. over the back areas in three to five doses at intervals of one to four days, until it approximates a 600 r. total.[19] With such therapy, 68 per cent were relieved.[9, 13] However three-quarters of the cases had mild toxic reactions, including nausea and general malaise. If two series effect no improvement, more are unlikely to be beneficial.[16]

Physical therapy and corrective exercises may be prescribed to relieve muscle spasm and correct deformities. Massage and assisted active exercises are of value if the patient is relaxed; more intensive therapy includes the use of heat by means of diathermy, infrared rays or hot compresses. Swimming helps to arch the back, and also aids in deep breathing which may be prescribed three times daily in an endeavour to increase chest expansion.[19]

Ankylosing spondylitis appears to be refractory to treatment with gold salts and antibiotics, and results following administration of various hormones or change in climate are most uncertain.[8] Recently d-tubocurarine in an oil and wax suspension has been given to patients after the usual therapeutic regimen for the disease has failed to produce significant improvement; it is believed to be of value as an adjuvant measure, especially if there is much muscle spasm.[20]

SUMMARY

1. Ankylosing spondylitis, also commonly known as rheumatoid spondylitis and Marie-Strümpell disease, is a chronic disease affecting the sacro-iliac, posterior intervertebral and costovertebral joints.

2. Published reports indicate that the incidence of the disease is increasing, primarily in males in the third decade of life.

3. Its aetiology is unknown and the precipitating factors are variable and inconstant.

4. The usual clinical picture includes an insidious onset of low back pain and stiffness, sometimes progressing to abnormal posture and peripheral joint involvement.

5. X-ray findings are characteristic when present; the earliest changes generally are seen in the sacro-iliac joints bilaterally.

6. Those cases diagnosed early benefit most from combined treatment including rest, deep x-ray and physical therapy.

7. No individual prognosis can be made since the duration of an individual case is unpredictable.

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NOTICE OF PUBLICATION

A sixteen-page booklet "Arthritis—Plan for Attack" has been published by the Canadian Arthritis and Rheumatism Society recently. Prepared with the advice and approval of the Society's Medical Advisory Board, the booklet will be of interest to many members of the medical profession.

The pamphlet is concerned with the problem of rheumatic diseases in Canada, a plan for a concerted attack upon them is presented, and the role of the Canadian Arthritis and Rheumatism Society is discussed. An extract from the booklet's preface indicates the general nature of the Society's approach to this problem; "In preparing this Plan, the Canadian Arthritis and Rheumatism Society has been deeply conscious of the magnitude of the problem which arthritis presents. It has been equally aware that a very great deal can be done, to relieve both the suffering of individuals, and the present drain on the nation's economy.

"It is also recognized that a plan of attack on arthritis can be carried out only through the effective co-operation, interest and participation of many agencies and groups, notably the medical profession, health and hospital authorities, medical schools and the general public. The Plan herein proposed discusses the role of such groups in a co-ordinated attack, and describes the Society's own position in relation thereto as but one active part of a greater whole."

Copies are available free from the Canadian Arthritis and Rheumatism Society, 74 Sparks Street, Ottawa.

KIDNEY RUPTURE—ITS DIAGNOSIS AND TREATMENT

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Trauma resulting in renal damage is rather uncommon because the kidney is deeply situated against the posterior body wall and is protected behind by a thick layer of muscular tissue and the lower two ribs.

DIAGNOSIS

The diagnosis of ruptured kidney is not usually difficult. There is a definite history of trauma followed by haematuria at the first voiding after the accident; this usually causes the patient to seek medical attention.

There are certain points worth emphasizing in the history. The commonest injury is a direct blow over the lower two ribs, as occurs in rugby or in striking the flank on a goal post in hockey. This type of injury damages the renal parenchyma directly with or without fracture of the overlying ribs.

Rolling injuries, such as being run over by a caterpillar vehicle, or twisting of the body, as occurs in dirt slides, also may produce damage to the renal tissue or its conducting apparatus. These are more likely to tear a ureter or renal pedicle by attendant shearing action, than by a direct blow.

Rupture as a result of minor trauma or even muscular strain usually indicates pre-existing disease or abnormality in the kidney. It is unusual for the overlying ribs to be fractured, for although a severe blow is delivered to them, they are able to give; yet fragmentation of the underlying kidney may still take place.

Commonly the history is of direct or indirect violence to the kidney area with immediate awareness of the patient, through pain, of serious abdominal injury. Almost invariably there is tenderness and spasm on the affected side and a mass is felt in the lumbar area early.

Finally, ruptured kidney may be discovered on routine examination of a patient who exhibits more striking injuries elsewhere.

LESIONS

The lesions of ruptured kidney may be divided conveniently into five groups depending on the extent of the damage:

(1) Intrapelvic rupture.
(2) Capsular cortical rupture (with or without intrapelvic damage).
(3) Complete section of the kidney.
(4) Tear of the renal vessels.
(5) Rupture of the kidney pelvis or ureter.

Associated with any of the last four groups there is rarely seen peritoneal tear with extravasation of urine and blood into the peritoneal cavity producing the additional signs of peritoneal irritation.

Certain clinical signs, associated with the history of accident will aid in differentiating the groups.

1. Intrapelvic Rupture—The injury is of moderate degree and is direct in nature. Damage occurs to the renal parenchyma with no associated capsular tear. There is gross hematuria, which is not as a rule severe and which rapidly diminishes to microscopic degree. As there is no actual rupture of the capsule of the kidney, there is no extravasation and, therefore, no mass to be felt. Of

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course, there will be tenderness and spasm in the costovertebral area. Serious shock will not be apparent.

2. Capsular Cortical Rupture—The history of the accident is direct in nature, severe in type, and there may or may not be moderate shock present. The tear extends through the capsule and therefore a para-renal extravasation takes place, which will produce in the flank a palpable mass of fluid under tension enclosed in the surrounding renal fascia. Gross blood, found initially in the urine, gradually becomes microscopic then disappears entirely.

3. Complete Section of the Kidney—In this type of rupture the body of the kidney and possibly the pelvis as well are completely divided transversely—usually into unequal portions. Invariably there is a history of severe injury and marked shock with extreme pain on the side involved. A large haematoma is formed. This haematoma may fill the whole flank from the costal margin to the iliac crest and extend anteriorly almost to the midline. The urine may or may not be bloody, depending which pole of the kidney is torn off. Grossly bloody urine that suddenly clears may indicate the beginning of recovery, but may also indicate that the ureter is blocked with blood clot and, therefore, that the situation is not improved. If this happens, the clinical course of the patient must be taken into account in deciding the further handling of the case.

4. Tear of the Renal Vessels—This rarely found group of cases, result most often from the shearing type of accident. There is immediate formation of a haematoma with a severe degree of shock. It may give a clinical picture not unlike complete section of the kidney but, if the ureter or kidney is not involved, no blood will appear in the urine. There will be a huge mass in the flank, and due to the excessive loss of blood the patient will be in a state of serious circulatory collapse.

5. Rupture of the Kidney Pelvis or Ureter—This group also is uncommon in occurrence. Rupture of the urinary conducting apparatus may be suspected if the force is the shearing type. In this group there is not so serious a degree of shock apparent. There is a more gradual development of a large mass from extravasation of urine, with little or no evidence of bleeding. Shock is not in proportion to the size of the mass. Rupture of the kidney pelvis or ureter is rarely seen more than 1 to 2 inches below the uretero-pelvic junction, and can occur without rupture of the kidney or tear of the renal pedicle. The urine released from the confines of the conducting apparatus seeps into the para-renal space to form a pseudo-cyst limited by Gerota's fascia.

Very occasionally, in association with the more severe degrees of rupture of the kidrey or conducting apparatus, the peritoneum overlying the kidney is either torn or burst, which allows egress of blood and urine into the peritoneal cavity. There is difficulty in differentiating this condition from combined intraperitoneal rupture of a viscus and damage to the kidney substance. Often, exploratory laparotomy is required before a decision can be made.

TREATMENT

In all the above groups the initial treatment is the same, and the subsequent decisions as to the use of more radical procedures depend on the clinical course.

In all cases of ruptured kidney the prescribed routine to be followed is:

1. Complete bed rest—flat in bed.
2. Ice to the affected side.
3. Adequate sedation to provide comfort, but

not enough to mask subsequent deterioration.

4. Estimation of pulse and blood pressure at intervals of one hour.
5. Estimation of haemoglobin and haematocrit frequently. Immediate crossing and typing for 1000 cc's of blood to be on hand. (Hb. should be estimated as a routine twice a day.)
6. Daily N.P.N. estimation.
7. Samples of each voided specimen of urine, kept in test tubes, properly labelled as to time and amount voided, in a test tube rack beside the bed.
8. Frequent examination of the patient from the clinical viewpoint to determine the response to therapy with special reference to the patient's general condition and degree of shock, amount of pain, appearance of a mass in the loin, or its progress.
9. Intravenous pyelography as soon as possible (pyelography is done within a few hours or within the first day or two of the patient's admission in an attempt to get an indication of the amount of damage to the affected side and to ascertain the presence and degree of function of the other kidney).
10. If conservative therapy is successful, as it most often is, confinement to bed for a total of 28 days after the disappearance of microscopic blood from the urine.
11. Conservative therapy, as outlined above, is to be attempted in groups 1, 2, and 3. Only if clinical conditions show a definite sign of deterioration due to continued bleeding, is operation decided upon. In groups 4 and 5, the therapy outlined above is carried out with the idea of getting the patient into operative condition, and then carrying out nephrectomy with despatch.

As can be judged from above, indications for surgical intervention include:

1. Uncontrolled initial haemorrhage.
2. Repeated severe haemorrhage.
3. Unduly prolonged haemorrhage.
4. Intraperitoneal haemorrhage.
5. Severence of a ureter.

No one sign or sympton is used as an indication for operation. The whole clinical picture including the patient's general state, pulse, blood pressure, level of haemoglobin with response to transfusion the amount of pain, the size of the mass on the affected side should be assessed. If operation is decided upon, nephrectomy is the usual procedure. Repair of the kidney is preferred, but is rarely possible.

It has been stated that if the pulse rises above 120 the necessity for immediate intervention has arisen. However, this may well be modified. If a large, firm mass develops in the flank, it is probably wiser to wait two or three days till clotting has had a chance to occur, provided that the patient's physical condition warrants this delay. If operation is attempted sooner, opening of Gerota's fascia with sudden release of the controlling pressure may result in uncontrollable, excessive haemorrhage. If no mass is forming and severe haematuria persists, then with a rising pulse, operation is not to be delayed.

COMPLICATIONS

1. Secondary Haemorrhage—The kidney apparently is slow in healing and is prone to secondary haemorrhage. Hence, even in cases of minor damage, the patient should be restrained for twenty-eight days as a routine, and longer if there is still blood or pus in the urine. Secondary haemorrhage necessitating nephrectomy has been known to occur 60 days after the original injury.

2. Perinephric Abscess—Extravasation of urine is said to cause perinephric abscess. But more likely, infection preexisting in the kidney flourishes in the perirenal clot. In this regard, it has been our impression that there is some temporary oliguria or even anuria which accounts for the relatively few perirenal infections. Retrograde pyelographic study is contraindicated to reduce this hazard.

3. Sequelae—Hydronephrosis may develop either rapidly or slowly due to

fibrosis from the healing process, either from infiltration of blood clot, or scarring of the urinary passages. Stone may occur with blood clot as the nidus. A small fragment of kidney may be deprived of its blood supply and persist as necrotic tissue constituting a foreign body.

Follow up intravenous pyelography is advised as a good guide to the progress of healing or to show if any sequelae are apt to occur.

4. Intrapelvic Extravasation—It has been definitely stated that the kidney with the intrapelvic type of rupture can be disorganized by rising pressure in the kidney pelvis as a result of blockage of the ureter. The kidney thus subjected to extravasation of blood and urine may become necrotic. This accident is indicated by sudden shock in a previously uneventful convalescence, usually within the first week. If this occurs, it demands immediate operative intervention.

5. Interpretation of Haematuria—Gross or microscopic haematuria found after an injury does not invariably mean a rupture of the kidney. Three recent admissions to the Toronto General Hospital were considered to have ruptured kidney on this basis, but it was subsequently proven that one had a renal calculus, another a hypernephroma, and a third, a prostatitis.

TORONTO SERIES

At the Toronto General Hospital, in a recent survey by Dr. William Kerr, 90 cases of ruptured kidney were reviewed, from 1909 to 1927. The following points from this resumé are considered noteworthy:

1. The total number of cases equalled 90.
2. Conservative therapy was used in 80 cases. Of these 80 cases, 8 died of multiple injuries and 72 survived.
3. Of these 72 surviving patients, only 4 have returned with late sequelae (3 cases of renal colic stemming from the side previously injured, 1 case of renal colic with gross hematuria) all of which responded to conservative therapy.
4. Surgical therapy carried out in 10 cases:
   (*a*) Nephrectomy—
   6 (all survived)
   (*b*) Repair of the kidney—
   1 (survived)
   (*c*) Drainage of a perinephric abscess—
   3 (one died, two survived)

Conclusions from this resumé

1. Immediate surgical intervention is not usually necessary.
2. Indications for surgical intervention are those which were previously mentioned in the main body of the paper, namely, uncontrolled, repeated or unduly prolonged haemorrhage, intraperitoneal haemorrhage or severence of a ureter.
3. If surgical intervention is considered necessary, nephrectomy is the usual operation, but repair of a kidney is desirable when possible.
4. Haematomas were found in 37 cases of the 90 reviewed. These subsided spontaneously in 90%—drainage is indicated when the haematoma becomes infected with extravasated urine, which is uncommon.
5. Known sequelae in this group of cases amounted to 4 in the 72 conservatively treated cases, or 5.5%. This low incidence would tend to justify the policy of not attempting prophylactic repair of the kidney, but rather treatment of sequelae as may be indicated when they develop.
6. The patient should be followed by intravenous pyelography in order to detect sequelae as early as possible.

OCCUPATIONAL THERAPY

HELEN DAVIES, O.T. Regd.
5T4

Occupational Therapy is comparatively new, but the basic principles underlying it are as old as history itself. Biblical reference is made to the use of activities as an aid to recovery. Galen, the Roman physician, once stated that "employment is Nature's best physician, and is essential to human happiness."

The first recognized training course in Occupational Therapy was given after World War I to provide trained therapists for veterans' hospitals. It was not until 1926, however, that a diploma course was organized in Canada, at the University of Toronto, to train qualified therapists to administer this treatment in all types of hospitals. At the present time Occupational Therapy is used in mental, general, veterans' and children's hospitals as well as in sanatoria, homes for incurables, curative workshops and Workmen's Compensation Board Clinics.

Occupational Therapy has been described as the scientific adaptation of activity as a treatment of specific mental or physical disability. It is always prescribed by the physician and adapted and carefully supervised by the therapist. The greatest tendency in Occupational Therapy is for the patient to do too much rather than not enough. But all exercise is carefully graduated according to the individual patient's ability. The progression of activity from simple to complex continues until the limit of improvement has been reached. The aim of Occupational Therapy is the restoration of function whether of mind or body, but it is the effort of the patient himself that results in his improvement or cure.

Occupational Therapy may be divided into two general classifications—specific and non-specific. Specific Occupational Therapy consists of prescribed activities which assist in restoration of joint or muscle function, improve general condition and aid in mental rehabilitation. Non-specific or diversional activities are used to induce rest or relaxation, control general exercise and to sustain morale. But no definite division can be made between these two groups—the same activity being used in both groups but for different purposes; *i.e.*, knitting may be used for a medical case, such as gastric ulcer, to induce rest, and may also be used as arm and hand exercise for a radial nerve lesion. To sustain interest and overcome any tendency to boredom, a combination of specific and diversional activities are used for each case whenever practical. One activity may provide specific exercise for the disability and the other may be diversional. A patient with a shoulder injury may weave on a specially adapted loom for specific exercise and follow this up with a game of ping pong as diversion. All activities, whether specific or diversional, are carefully analysed as to the exact amount of muscle movement, and this is never lost sight of when suggesting activities in which the patient might be interested. But a patient's interests as well as his disability must always be considered when choosing the type of work the patient will do, because a patient will receive much more benefit from work that he enjoys than from something in which he has no interest.

For specific and diversional cases,

craftwork is the medium generally used because it presents a wide choice of interests, and most patients consider it more of a hobby than a form of treatment. As the patient becomes interested in his project, he exercises the affected part more than he ever thought possible. This is especially true of the neurotic patient or when the desired movement is very painful. But Occupational Therapy is not limited to craft work, by any means; music, photography, gardering, recreation and educational subjects are all used as treatment for specific disabilities.

IN GENERAL HOSPITALS

Occupational Therapy is of great value in general hospital for long term cases, whether medical or surgical. By keeping the patient mentally alert, happy and content, nursing is made easier and the period of convalescence is shortened. It is a well known fact that a patient with high morale recovers much more rapidly than one who is worried or depressed. Because it can graduate easily, Occupational Therapy, in the form of light bed activities, may be started even before the patient is able to sit up, and can be increased as the patient's condition improves.

It is especially valuable in medical cases such as heart conditions and arthritis, in which the period of bed rest is long. For these cases carefully supervised occupational therapy helps to pass the long hours, prevents boredom and restlessness, and at the same time maintains muscle tone. To the arthritic patient, Occupational Therapy is much more than an enjoyable pastime; because it can be taken in frequent small doses, it is of great benefit in maintaining and increasing joint mobility without undue fatigue.

In surgical and orthopaedic cases, Occupational Therapy works hand in hand with Physical Therapy to shorten hospitalization and assist in maximum recovery. At first the orthopaedic case receives only Physical Therapy treatment, and his Occupational Therapy is entirely diversional. As the patient's exercise tolerance increases, he is started on specific occupational therapy designed to fit in with the treatment he is receiving in the Physical Therapy department. Usually the patient goes to Physical Therapy for a period of limbering up with massage, short wave, or whatever treatment he is receiving there, and then continues his treatment with more sustained exercise and recreation in the Occupational Therapy department. Close co-operation is maintained between these two departments at all times to obtain maximum benefit for the patient, and to avoid needless or harmful repetition.

The amputation case is a good example of this co-operation. While still a bed patient he receives Physical Therapy designed to harden the stump and diversional therapy from Occupational Therapy. When he receives his prosthesis he continues to go to Physical Therapy, but Occupational Therapy takes on the responsibility of training him in the use of the new prosthesis. It is not until he can successfully complete a rigid series of tests which have been designed to demonstrate proficiency in the use of the prosthesis, that a patient is considered as discharged from Occupational Therapy. These tests consist of situations which the amputee will meet in everyday life, such as light switches and water taps for the arm amputee, and steps of varying heights for a man who has lost a leg. When the amputee has passed all these tests he can face the world again with confidence.

IN CHILDREN'S HOSPITALS

In Children's hospitals Occupational Therapy utilizes the fundamental instinct of play to combine specific treatment of either medical or surgical conditions, and a safe outlet for the child's natural desire for activity. Quiet play, such as cutting paper dolls, is ideal for the cardiac child who must be kept happy and interested during long periods of bed rest. Group games in which all patierts on the ward may participate are a great help in overcoming any fear the young orthopaedic patient may have of moving an injured part. With patient but persistent training in the Occupational Therapy department, the spastic child gradually overcomes the spasms which prevent him entering the games with the other children. The pyramid of blocks may be knocked over many times before it is completed, but when it is finished the pride in his accomplishment acts as a spur to further effort on the child's part. The rhythm band is always a popular form of treatment with the children, combining as it does the children's innate love of rhythm with training in arm coordination which is so necessary for all types of nerve injury and paralysis cases. By directing their activity into constructive and interesting channels, the children's co-operation with all the staff is increased and their period of hospitalization .s reduced.

IN MENTAL HOSPITALS

Mental hospitals always have been, and probably always will be, the largest field for Occupational Therapy, because it is the most generally used form of treatment in mental hospitals to-day. The activities used in Occupational Therapy offer concrete interests to replace the patient's delusions or stir him out of his depression. When a patient becomes absorbed in what he is doing, he has little time for his world of fantasy. It is difficult to be too depressed when you are busy making a useful article in bright, cheery colours; on the other hand, the steady rhythm of simple weaving on a large loom soon soothes the overactive or manic patient. A suitable occupation sufficiently stimulating to the mind that it replaces unhealthy thoughts with healthy ideas and retrains the mind in orderly thinking may be found in a manual skill or recreational activity. In group activity such as team games or picnics, the anti-social patient gradually learns to behave in a socially acceptable manner, the overactive patient is given an opportunity to work off his energy, and the lethargic ones regain their ability to concentrate. Any activity of curative value, whether it be working in a hospital industry, such as the kitchen or the laundry, or attending a carefully selected movie, is used in helping the psychiatric patient adjust to society.

Whether or not they understand or appreciate music, there are very few people who fail to react to the mood of a piece of music when they hear it played. This applies to an even greater extent to mental patients. Many patients who appear distant or unresponsive may be reached by music in the form of a community sing or an informal concert when all other methods of contact have failed. The strong appeal to their emotions made by the music can be controlled by careful choice of programme. The disturbed patient may be quieted by fast music that suits his mood, and then is gradually changed to a slow quiet tempo; the opposite effect is obtained with depressed patients by reversing this procedure. Whatever the type of patient, music forms a large part of the Occupational Therapy programme in mental hospitals.

IN T.B. SANATORIA

Second only to mental hospitals in the use of Occupational Therapy are tuberculosis sanatoria. This may seem contradictory when rest is such a large factor in the treatment of tuberculosis. But, for the patient who must spend months and even years of enforced idleness, Occupational Therapy provides both mental and graduated physical exercise to induce physical relaxation and build up work tolerance. The editing and publishing of a hospital newspaper is often undertaken by the patients, and inter-ward radio programmes under the direction of the occupational therapist are a regular feature in many sanatoria. Younger patients, whose schooling has been interrupted by hospitalization, have an opportunity to continue their education under the guidance of the school teacher or occupational therapist. For many patients whose pre-hospital employment is unsuitable, the skills acquired through Occupational Therapy often become the foundation for satisfactory post-discharge employment.

IN CURATIVE CENTRES AND INDUSTRIAL CLINICS

Occupational Therapy is available, not only in hospitals, but also in Curative Centres and Industrial Clinics in many of the larger cities. To these curative centres the physician may refer any of his ambulant cases—medical, surgical, tuberculous or psychiatric—for occupational therapy. For patients recently discharged from hospital, the continuation of treatment reduces convalescent time and bridges the gap between hospital and full time activity. Treatment in curative centres, if started in time, may assist in recovery and prevent hospitalization of many cases, especially mild psychiatric and neurotic patients.

The Workmen's Compensation Board operate several industrial clinics across Canada where men who are injured at work are sent for treatment. In these clinics the aim of all treatment is to get the patient back to work as quickly as possible and in the best physical condition. The treatment is very highly specialized so that each patient's improvement can be accurately measured in degrees of movement, pounds and inches. As far as possible, each workman uses the actual tools of his trade—the bricklayer carries a hod in which the number of bricks are increased as his strength increases, the railwayman works with actual ties and rails. The treatment is started while the patient is still in hospital and continues until the patient is able to return to work. For several days before returning to work, each man does a full day's work of the same type in the clinic. If the patient is able to do this, he is able to go back to his job.

As well as the above-mentioned hospitals and clinics, Occupational Therapy is used in Homes for the Aged, Hospitals for the Chronically Ill and sheltered employment workshops. The impetus provided by the second World War has greatly increased the recognition and appreciation of the value of Occupational Therapy, but there are still many hospitals in Canada which are without Occupational Therapy departments. As its services to the patients, doctors, hospitals and communities become better known, the day is not far distant when all hospitals will have a Department of Physical Medicine with a staff of trained Occupational and Physical Therapists and Social Workers.

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EDITORIAL

We who are to become doctors are privileged. No other profession is so intimately entrusted with the physical and mental happiness of human beings.

Privileges imply responsibilities; it is our duty to society and to ourselves to nourish a directed curiosity, to study dispassionately yet with our hearts in our work, to do our utmost lest we endanger our future patients and cheat our capabilities. It was Osler's dictum that "The master word in medicine is 'work' " and this is our principal object as medical students.

Nevertheless, the acquisition of technical skills, technical knowledge, and a flawless facility in polysyllabic medical jargon is not enough. In order to make this shapeless maze of information useful we must, if possible, learn to think. Even granted a combination of sound medical knowledge and the ability to think scientifically, we are not yet doctors.

A doctor is so much more than an able medical scientist. He is also a kind and practical friend, a counsellor, a gentleman, and a leader amongst his fellow citizens. He should be broad in his knowledge of the vast world which is beyond medical horizons. Only in this way can he hope to understand people. Only in this way can he hope to understand his own position in society.

Our University life is potentially a rich one. It is overflowing with opportunities for sports, music, literature, art and dramatics. There are clubs by the score and special lectures on a galaxy of topics. We are presented with all these good things; it is for us reasonably to use them to help us to complete ourselves as individuals.

D.C.H.

FEATURE

OSTEOLOGICAL EVIDENCE OF DISEASE AMONGST THE HURON INDIANS

R. I. HARRIS, M.C., M.B., F.R.C.S.(C)*

When the French first established permanent settlement in Canada (1608) the district which, in modern Ontario lies between Lake Simcoe and Nottawasaga Bay of Lake Huron was occupied by the Huron Indians, a branch of the Iroquoian family which had migrated from the area south of Lake Ontario. In the fifty years which followed the settlement of the French at Quebec this district was the object of intensive efforts to develop the trade in furs and to christianize its Huron inhabitants. Government Reports and the *Jesuit Relations* are filled with details of the life and habits of the Hurons.

Further knowledge of their way of life has been obtained in recent times by examination of their abandoned village sites. They were a primitive agricultural people living in communal huts of bark in stockaded villages. Maize, pumpkins, fish and game were their food. Even in pre-European days there was an appreciable trade by barter which extended from the Atlantic coast (wampum) to the middle west (arrowheads and stone for pipes). With the advent of the French, trade in furs became the mainstay of their economy. In exchange for furs, chiefly beaver skins, which they conveyed in canoes to Montreal and Quebec via Lake Nipissing, the Ottawa and St. Lawrence rivers, they received the tools, weapons and utensils they formerly had made themselves.

The use of wood for fuel necessitated moving their villages when the trees nearby had all been used. It was easier to build a new village with easy access to wood and water than to haul wood increasing distances. Consequently the number of abandoned villages is great in relation to the total number of inhabitants of the area and their refuse dumps and fire places yield much material of interest.

It is the peculiar nature of their burial custom, however, which gives us the information of greatest anthropological and medical interest. The dead were finally disposed of by pit burial. When death came to a Huron Indian, his family wrapped his body in beaver skins and encased it in a protective covering of bark tied with rawhide. It was then placed in a tree crotch or on a specially constructed platform to protect it from the depredations of wild animals. Bodies of children were buried beside trails because there they brought good fortune. The bodies were carefully tended by their families because the spirit of the dead still remained in or near the body, waiting for the time when they might leave the earth for the happy hunting ground.

At intervals of approximately ten years, the bodies of the dead were gathered together and buried in a common pit after ceremonies intended to free the spirits so that they might pro-

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ceed on their journey. Scattered throughout Huronia are numerous ossuaries which mark such pit burials. Most of these have been despoiled by souvenir hunters. In 1946-1947 for the first time a systematic study of one such ossuary was undertaken by Professor T. L. McIlwraith of the Department of Anthropology of the University of Toronto. It was on the outskirts of the former huron village of Cahiague, about midway between Coldwater and Orillia. This village has the distinction of being the place of winter residence of Cham-

FEAST OF THE DEAD—COMMUNAL BURIAL.

FIG. 1

plain in 1615-1616 when, on his first visit to Huronia, he accompanied a war party of Hurons on an expedition against the Iroquois and had the misfortune to be wounded.

Professor McIlwraith was kind enough to give me an opportunity of examining the osteological material removed from this ossuary for evidence of disease. The more interesting findings are recorded in this paper.

The manner in which the remains of the dead were consigned to the pit resulted in there being no intact skeletons. The disarticulated bones of those long dead were poured into the pit; the bodies of the more recent dead were thrown in on top and the whole mass levelled off by men who stood in the pit and raked the bones about. Therefore what we find to-day when an ossuary is opened is a mass of individual bones inextricably mixed with one another, with no possibility of matching them to their fellows to form an intact skeleton. Moreover, the prolonged action of the sandy soil on the bones has removed the collagen from their ground substance leaving only a brittle calcium framework which often is broken. The material for study consists of a mass of fragmented bones, very few of which can be related to one another.

NUMBER OF BODIES IN CAHIAGUE OSSUARY

No accurate figures can be obtained of the number of bodies originally placed in the pit. The pit had been opened many years ago by local inhabitants and from time to time there has been much souvenir hunting amongst the bone fragments. The scattering and disintegration of the bones made any count of bodies difficult. Only half of the contents of the pit was removed by Professor McIlwraith. An approximation of the number of bodies placed in the pit was obtained by counting the identifiable bones or fragments of bones. There were, for instance, one hundred and twenty-eight upper ends of the right femur. This was the largest count for any bone or fragment of bone. With some approach to accuracy, therefore, we may assume that the whole pit contained at least 250 bodies.

AGE OF INDIVIDUALS

The skeletal remains came from individuals ranging in age from earliest infancy to old age. Some of the infantile remains are very small; one intact humeral diaphysis is only two and one-quarter inches long. It is quite possible that this came from an unborn child. Many of the vertebral fragments indicate an age less than one year (three centres of ossification still separate).

EVIDENCES OF TRAUMA

There is less evidence of trauma than might be expected. Though the burial customs excluded those who lost their lives far away from home, on war or hunting parties, one would have thought that hunting, felling trees, handling stones and fighting might frequently have been the cause of injuries which would result in fractures and death. The fact is that few fractures were found. The best example is a malunited fracture of the shaft of the femur to be seen in the exhibit in the Royal Ontario Museum. In addition there was an ununited fracture of the clavicle, a fracture of the lower end of the radius with slight deformity and a deformed first metatarsal head which might have been caused by a crushing injury such as a rock falling on the foot. A frontal bone with a round perforation in one frontal eminence may represent a traumatic lesion; for example, perforation by

an arrow or a musket ball. This type of perforation has been noted before in Huron remains.

EVIDENCES OF TUBERCULOSIS OF THE SPINE

Two vertebral bodies, one lumbar and one dorsal, present lesions which almost certainly represent Pott's disease. Both bodies have been excavated by an inflammatory process which has produced a large defect. The opening through the superior surface is smaller than the lobulated space in the substance of the body and the margins of the opening and the wall of the cavity show condensation of the traeculae. This is the characteristic appearance of early Pott's disease (see illustrations). No other lesion can produce quite this picture. Metastatic carcinoma can cause destructive lesions of vertebral bodies but these usually are multiple and they do not present evidence of repair as do inflammatory lesions. Staphylococcal osteomyelitis in modern Canadians is rare and the lesion produced is different (absorption of the intervertebral disc and fusion of two vertebral bodies).

If this be tuberculosis as it seems to be, it is interesting to speculate upon the source from which the Hurons might have contracted the disease. From the material in this ossuary there is no justification for supposing that the disease existed before European contact. The ossuary contained copper utensils and glass beads of European manufacture. The probable time of this pit burial (1615 to 1630) would permit ample time to acquire the disease by contact with the French in Montreal and Quebec and to transfer it to Huronia. It is interesting to note, however, that Dr. Gerald B. Webb of the Colorada Foundation for Research in Tuberculosis believes that tuberculosis existed amongst the North American aborigines in pre-Columbian times. His belief is based upon the evidence of statuettes and paintings depicting the characteristic deformities of Pott's disease.

ANKYLOSING SPONDYLITIS AND OSTEO-ARTHRITIS

By far the most common pathological lesion seen in these bones is a type of productive arthritis manifested most frequently in the spine. It has many of the aspects of ankylosing (Strumpell-Marie) spondylitis since there is ossification of the longitudinal ligaments of the vertebral bodies and the ligamentum flavum and osteo-arthritis of the costo-vertebral articulations. However, certain distinctive and common manifestations of ankylosing spondylitis are lacking. Bony fusion of one vertebral body to another is rare; there are a few examples in the Museum. Involvement of the sacro-iliac joint, so characteristic of ankylosing spondylitis, was completely absent. Manifestations of osteo-arthritis in joints other than those of the spine are infrequent.

SQUATTING FACETS

In 1889 Arthur Thomson observed an anomalous articular facet between the anterior edge of the lower end of the tibia and the neck of the talus in the skeleton of a Veddah Indian. His subsequent studies indicated that primitive races which spend much of their time in the squatting position force the foot into sufficient dorsiflexion to bring the neck of the talus into contact with the anterior margin of the lower end of the tibia. An articulation develops between these two bony points and is anthropological proof of a lifetime habit of squatting. There is a good summary of our knowledge of this condition in Wood Jones's monograph on The Foot.

FIG. 2

Lumbar vertebra excavated by a pathological process which must be tuberculosis.

FIG. 3

A dorsal vertebra with a characteristic area of tuberculous caries destroying the cancellous center of the body.

FIG. 4—A recent post morten specimen from a patient at Weston Sanitorium. Early lesion of Pott's Disease similar to the specimens recovered from the ossuary of Cahiague.

We have little difficulty in appreciating that the Hurons of 325 years ago must have spent much of their time in a squatting position; tending fires, cooking, waiting for game, fishing, sitting, would all involve this posture. But it is interesting to find in the bones from the ossuary of Cahiague the indisputable evidence of their squatting habits in the high incidence of these squatting facets on tibia and talus. They were present in nearly fifty per cent of all tibiae.

TEETH

Caries was occasionally present but was rare. There were, however, a great many completely or nearly completely edentulous jaws. With the low incidence of caries, the frequency of toothless jaws would seem to be due to aveolar absorption. A detailed study of the teeth is being made by a member of the Faculty of Dentistry.

SUMMARY

We have little historical evidence of the nature of the diseases prevalent amongst the Hurons. The *Jesuit Relations*, though replete with detailed accounts of missionary work in Huronia say little which is informative regarding disease and injury. The ossuary at Cahiague is the first which has been examined accurately by a group of anthropologists and this is the first occasion on which osteological remains have been studied for evidence of disease. Further studies are needed. During the summer of 1948 Professor Kidd opened an ossuary near the site of the former Huron village of Ossossonee. This had never before been opened. Almost certainly it was the burial pit at which Father Brebeuf witnessed the mortuary ceremonies he recorded in the *Jesuit Relation* of 1636. The material from this ossuary is now being studied by anthropologists. When they have completed their work the material will be available for examination for evidence of disease.

The brief survey recorded in this paper upon a limited amount of osteological material from a Huron ossuary indicates that the Hurons suffered from tuberculosis of the spine and also from a curious form of productive arthritis affecting chiefly the vertebral column and having many points of resemblance to ankylosing spondylitis. They suffered their share of fractures but less than one might imagine. Their skeletons present many features of anthropological interest.

HUMANISM AND MEDICINE

H. B. VAN WYCK[1]

PART VIII
IMPERIAL ROME

It is convenient to consider in outline the five centuries of Roman history from 146 B.C. when Rome finally crushed her rival Carthage, until in 330 A.D., the emperor Constantine the Great made Christianity the official religion of his empire. The latter date marks one of the watersheds of history, inasmuch as at this time the official Roman recognition was given to Christian Orthodoxy and church organization. The beginning of the fourth century also marks the end of the 500 years of stable Roman government and saw the beginning of the decline. It was at this time that Constantinople was founded and the Imperial government of the Empire became centred in that city on the banks of the Bosphorus. This transposition of the centre of the world to the east also marked the beginning of the 1000 years of Byzantine history which terminated in 1453 when Constantinople crumbled, and with it Eastern Christendom, before the invading Turk. During most of these five centuries Rome dominated the Mediterranean world from the Rhine and the Danube to the African deserts, and from the Straits of Gibraltar to the banks of the Indus River. This great political and military organization, the Roman Empire, has left an influence of great permanence on subsequent ages.

The elements in our modern world which derive from classical Rome are manifold, but often forgotten, although the evidence is everywhere. In our Churches, we find a strong tradition of moral order which stems back largely to that Roman world; in our universities, a heritage of intellectual order from the same source, and, most conspicuously in our law courts, we see the evidence of a tradition of legal order. Even at this distance of time, we are surrounded by many reminders that point back in the same direction. The Roman arches in our Norman Gothic University College building, the motto on the University crest, and the very speech we use, owes much of its logic, clarity, and picturesqueness to its Latin derivatives. Just as from the Greek language we have received an enriched vocabulary for science and philosophy, so our language owes much to Latin from which it has borrowed most of the terminology of the practical sciences, law, and government; and, in many non-technical words of colour and force, the romantic and exciting historical pageantry of the middle ages lives again. A few examples will suffice: "pilgrim", "crusade", "forum", "villa" bring back a wealth of colourful associations, but the poetic imagery in such words as "dilapidated", "decimated", "succinct" is often unnoticed.

The traveller in Europe will be reminded at his every footstep of traces of the Latin past. The Roman roads and

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Roman baths, the bridges and aqueducts, the remains of great harbours, amphitheatres, and law courts, the works of sanitation and the triumphal arches, all strewn as they are throughout Western Europe between the Rhine and the Mediterranean, recall the glory of a vanished race. These are the visible and tangible remains. The invisible influences of Rome upon our modern way of life are not less impressive. Not only did Rome pass on to us its special concepts of law, government and international relationships, but Rome became the channel by which the rich heritage of Hellenic civilization and the Far East became ours. This legacy from Greece and Palestine joined to the special contribution of Rome is what we now know as our legacy from the Graeco-Roman civilization, our parent civilization.

This all has come to us through several channels. One was the direct transmission mostly through the scholars of the mediaeval Christian church. Another channel was the Greek Byzantine Empire which, when it fell, spread displaced scholars throughout the west and these brought precious records of Hellenic humanism and science to stimulate the Renaissance of the 14th and 15th centuries. A third source of the science and philosophy inherited from the Graeco-Roman civilization was the Arabian world and especially Mohammedan Spain. From the Universities of Cordova and Seville were returned to the west many a lost treasure.

However, without the stable political state built by the Romans, a state utterly beyond the ower of the Greeks to establish, the culture of the Greek world would have been largely lost beyond recovery. The Romans took the speculative science of the Greeks and adapted it to practical ends in engineering, architecture, agriculture and war. Roman medicine was Greek medicine. They took unto themselves the Alexandrines, Asclepiades and Galen. Little was added by any Roman to the basic sciences of physiology and anatomy. The Romans organized medical schools, hospitals (*Valetudinaria*) and the first efficient army medical corps. Roman philosophy was Hellenic or Hellenistic. The greatest Roman humanist, Cicero, adorned but did not add much to the speculative thought of the Greeks. And the greatest poets of the Latin world drew their sources from Greek origins; Virgil, who adapted from Homer an artificial and fanciful early history of the Roman people in the *Aeneid;* Lucretius, who elaborated the atomic theory of Democritus and the hedonistic religion of Epicurus in one of the world's greatest epics *De Rerum Natura*. In all this, the Romans were imitators and chroniclers; but, in the fields of law, government, and engineering, they were supreme.

The contrast between the Greek and the Roman was not promised by their early origin. Each people began as Indo-European tribes invading the Mediterranean basin. Each presented an intermingling of the long-headed, brown-skinned Mediterranean peoples with the short-headed Alpine racial strains, yet the marked difference in their civilization would seem to prove that race itself does not seem to influence greatly the direction of either culture or political history. The Romans and Greeks like the Slavs, the Celts and the Teutons belong to the Indo-Europeans or Aryan-speaking peoples; but, if the Celt and the Slav and the Teuton are cousins to the Latins, Greek and Latin are sister languages. The similarity of certain common words like mother, father, and brother show that these two peoples remained together to a fairly late period in pre-historic times, probably before they settled into their Mediterranean

homelands. When, however, they appear in history they develop into completely different people with a markedly different outlook and achievement. This would seem to prove that the development of civilization depends more on environment, geographical and climatic, and on contact with neighbouring cultures rather than on any special racial genius.

Beginning as a small nation of farmers fanatically republican in sentiment, with no conscious Alexandrian programme of world conquest, they dealt, one by one, with their frontier troubles as they arose and gradually drew the surroundings states into their orbit of government for which the Latin peoples had a unique talent. Like the United States of America, a continually expanding foreign policy was forced upon them. In fact, there is much similarity between the ancient Romans and the modern citizens of the United States. They are both intensely practical and efficient in getting things done. They both began principally as farmers, but before long had problems of foreign policy to solve because of their continually shifting frontiers of influence. To both, their philosophy concerns itself more with what works than because of any ideological considerations. With this pragmatic attitude of mind also has been developed in both peoples an instinct for order; and, just as the function of Rome was to bring order out of chaos, perhaps this is the role of the United States of America for the future. Just as in the modern state with the wealth of the world pouring into its coffers there might develop a plutocratic class which may destroy the very essence of their supposed destiny, liberal democracy, so in old Rome of the Empire with her expanding borders, the resultant wealth that poured into the state treasury produced a class which, avid for further spoils, gradually undertook the unequal burden of a far-flung empire. Without imagination, but with a power of adjustment, the dominions of Rome extended ultimately beyond the capacity of her civil service to administer, or her primitive means of communication to unite; but, before the inevitable decline set in about the third century A.D., Rome had provided the *pax Romana* over the ancient world. Gibbon, in speaking of the second century A.D., the age of the Antonines, the good emperors, writes as follows, "If a man were called upon to fix the period in the history of the world during which the condition of the human race was most happy and prosperous, he would without hesitation name that which elapsed from the death of Domitian to the accession of Commodus." Although this was a rose-tinted view of a world rampant with the evils of slavery and gladiatorial spectacles, with a feeble economic system, with Italy going out of cultivation, and with every sign of the imminent decay of the state, if one judges by the general happiness as a standard, undoubtedly this age of Roman glory, the second century, was much better than any later age before the Renaissance.

Roman annals are not illuminated with original thinkers like Pythagoras, Democritus, Plato, or Aristotle. The Romans gave birth to no mathematical geniuses like Euclid or Archimedes, no pioneers of science and medicine like Hippocrates or Erasistratus, no inventors of the calibre of Hero of Alexandria. Rome imitated its brilliant predecessors and was content to apply their scientific advances in developing the material comforts of life to a stage not surpassed until the last century. The Roman was at his best in engineering, cartography, and the application of the mechanical

arts, astronomy and medicine to practical if static ends. He achieved wonders with a human treadmill and pulleys, and surveying instruments- he improved surgical instruments and developed agriculture with tree grafting, soil drainage, and cross-fertilization.

One of the most important works of the Augustan Age was the ten books on architecture of Vetruvius, an encyclopaedia of the technical knowledge of his time. Pliny's *Natural History* (33-79 A.D.) was a farrago of facts and wonders, a great storehouse of credulity, of sense and nonsense and this book disputed with the more scientific works of Aristotle, a popularity among the literate as the most useful compendium of knowledge, surpassed later only by the Bible and St. Augustine's *City of God.* The engineering feats of the Romans were the wonder of the contemporary world. Many remain in an excellent state of preservation and they may fail to convince a modern inhabitant of a great metropolis that he has much advantage in material comfort over the citizens of Imperial Rome. The better class Romans enjoyed the amenities of plumbing, steam baths, adequate water supply, and drainage. In the provinces that demanded it, central heating was developed as in Britain; and one may enjoy the paradox that the conservative Briton has not yet caught up in comfort with his ancient Roman conqueror. Throughout the Roman world prosperous cities joined by roads in good repair and of great permanence were available to the traveller where he could find comfortable inns, baths, amphitheatres and temples. For the sailor, there were deep-well-equipped harbours, canals, and lighthouses. Bridges designed to outlive the ages exist in use to the present day. Fourteen aqueducts built like elevated roadways on endless arches stretched to Rome from the distant hills; some of these still bring fresh water from the upper regions of the Tiber to the citizens and fountains of Rome. With stone, brick, and concrete, vaulted domes were built above splendid public buildings, and a rounded arch extended into the groined vault of modern buildings discloses the survival of Roman influence in architecture. The Greek built for perfection and grace, and his greatest structures were dedicated to his religion. The Roman with arch and dome sought magnitude and grandeur and reared piles of masonry for practical use as country clubs, courthouses, amphitheatres, and libraries. The Roman architect invented the commemoration form in building triumphal arches on whose surfaces relief sculpture depicted the campaigns of their great soldiers. Roman painting and sculpture tended to be imitative with its emphasis on naturalism and portraiture rather than on the idealized art of the Golden Age. In the conquest of the East, Rome despoiled the conquered of their art treasures, and these served as models for the Roman artist, who however, being more imitative than creative, was unable to reach the excellence of his predecessors.

The dean of the Roman writers on medicine was Celsus who wrote in the reign of Tiberius (14-37 A.D.). He compiled an encyclopaedia of which only the medical parts have survived. These have remained the most important later work in the field ranking with the works of Hippocrates and Galen, and give an adequate summary of Alexandrian medicine. *De medicina libro octo* displays a considerable knowledge of osteology, especially of the skull; the difference in form of the male and female pelvis is noted. Surgery is dealt with in detail. Little, however, was known of surgery at Rome before Celsus who mentions

that Greek medicine began to appear in Rome with the advent of Asclepiades from Alexandria in about 100 B.C.

The advance made since the Hippocratic era by Hellenistic medicine is seen in the pages of Celsus. He gives a good description of the amputation of a limb and advises the use of a ligature as an alternative to the red-hot cautery iron; plastic surgery, lithotomy, cataract, hernia, suture of the abdominal wall and intestine, are all described, and the symptoms of inflammation are noted—rubor, tumor, color, and dolor. In the ruins of Pompeii have been found iron bistouries, bronze forceps, lancets, probes, catheters, and anal and vaginal specula. The age following Celsus was one of the most brilliant in the history of medicine, anatomy, and surgery, largely, as has been noted above, due to the Hellenistic or Alexandrian Greeks.

Only a small fraction of the medical literature of the time survived. Soranus came to Rome at the end of the first century, B.C., and was followed by Galen about 160 A.D. After Galen's time, the standard of surgery and anatomy declined rapidly and what little we know of the healing art in the declining age of the Roman Empire is found among the Byzantine chroniclers, Aetius, and Paul of Aegina (the sixth century), whose voluminous tomes show the decadence from a classical to a mediaeval standard.

The Romans gave to civilization the first organized hospital and specialized medical school. The first systematic teaching of medicine in Rome was done by Asclepiades after his arrival, and by the time of the Emperor Vespasian, the state-supported *schola medicorum*, while never research centres, served as depots for the training of army surgeons. While the nearest approach the Greeks made to hospitals were the temples of Aesculapius, the Romans by the first century had well-organized infirmaries or *valetudinaria* for the treatment of soldiers, sailors, gladiators, and the slaves of the big estates. Excavations have revealed that these had adequate facilities for drainage and sanitation. These institutions were widespread throughout the Roman world and were somewhat insecurely supported by the state until in the Christian era they came under ecclesiastical control.

Military surgery, by the time of Trajan, had attained a high degree of organization. Each cohort of 1500 men had four surgeons (*medici legionis*). In the fixed camps there were a staff of medical officers and military hospitals were distributed throughout the provinces. In the Roman armies of the sixth century we know that each troup of 400 men had eight mounted first-aid men. At this time, we hear of a naval surgeon appointed to each vessel of war.

The greatest contribution that Rome has made to our life was in the field of law. She formulated and stabilized the theory that the state is the fountain of justice and as such, is supreme over all individuals and all groups. That supremacy was exercised in order to protect individual rights. For the first time in history, the rights of man were written into a constitution and he was protected from, at least in theory, the despotic acts of a governing power. The Roman legal profession attempted with some success to harmonize into one code the ethical practices of many races. Roman law as mediaeval church law became all-powerful, until with the rise of nationalism under monarchy, this same legal tradition of a supreme law encouraged the monarchs to destroy the power of the church over the state, of the ecclesi-

astical over the secular order of society. It may be said that if Roman law became the basis for despotic absolutism in the middle ages, it became the stimulus to popular rebellion against tyranny in modern times; because the essence of Roman law was that the state's sovereignty was rooted in the consent of the people. "Among the agencies that have done most to build up the collective force of man for the conquest of nature and the improvement of his lot, one of the highest places must be assigned to Roman law. It was the leading agent by which the Romans carried out their incorporation of the west and also their most notable bequest to the nations that have since taken up the task of the vanguard of mankind. In a thousand ways, sometimes outside the strictly legal sphere, it has worked in later years to preserve those principles of order and continuity in development which the Roman genius first established in the world. . . . The very notion of an ordered progress in human affairs takes its rise in the study of Roman law. It was in the school of law at Naples, early in the eighteenth century that Vico first conceived and sketched the idea of the historic method in studying the past, which has grown in force ever since, and now dominates our view of history as completely as Darwin's theory has revolutionized biology. For Vico, inspired by the history of Roman law was the first to suggest that changes in civilization could be interpreted according to an ordered sequence, which has its moving force in the growth and change of the collective mind of mankind from generation to generation. The Romans had offered in their history the most unmistakable incidence of such a sequence. Their genius was as apt for building up institutions and human law as the Greek for discovering the abstract laws of thought and nature, and the fact of progress was in the first place more easily apprehended from the rules and conditions which man had made to surround his own life than from the less visible, the more fundamental changes in the general ideas which form our science, philosophy and religion. Thus it is that progress is a Latin word and that the Romans first suggested the idea, while we have not yet even fully realized what the Greeks did for the growth of the human mind nor the place which abstract thought must take in a true view of historic evolution. The next stage in Western history illustrates this conclusion in a striking and unexpected way.

"At first sight in mediaeval Europe, Roman institutions seem to have been completely shattered and the onward course of science hopelessly obstructed. But in the end it will be seen that by a fresh direction of the intellect, the Roman work of incorporation was being actually extended and in power and depth, the collective mind strengthened though on other lines than the Greeks and Romans could themselves have understood."[2]

With all its defects, the empire of the Caesars was a noble experiment in world government. The contact of the legal instincts of the Romans with the many cultures and peoples in the imperial orbit nourished the concept of the rights of man. This *ius gentium*, which in theory at least involved all free men everywhere by its recognition of a natural equity common to all mankind, softened even the asperities of slave life. This first recognition of the ideal supremacy of international, or better, supernational law, has had lasting effects on the ad-

[2]*The Living Past*—F. S. Martin. P. 115.

vance of our civilization, although its early association with conquest by arms and a growth of empire left an unhappy, though perhaps inevitable, tradition. This has survived as an out-of-date Caesarism in our generation which is beginning to recognize that only a co-operative all-embracing society of world government, when the world is ready for it, by free peoples, who will submit to it, will permit the survival of the human race.

AN UNEQUALLED OPPORTUNITY

An intimate doctor-patient relationship is something that is rarely achieved in a public ward by even the most artful physician. It is generally agreed, however, that the first person to examine a patient has the greatest opportunity of gaining the patient's confidence and co-operation. How much more difficult it is, then, for the student who arrives perhaps days after the patient's admission to hospital. For this reason the recent change in clinical teaching, allowing final year students on the medical wards to see the new patients as soon as, or before, anyone else, is a momentous one. The student can now examine his patient in the acute stage of the disease, and can follow him through to discharge in a way which was rarely possible before. This is an unequalled opportunity and full advantage should be taken of it.

G.L.R.

RECENT ACCESSIONS TO THE MEDICAL READING ROOM

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ABSTRACTS

MEDICINE

Homologous Serum Jaundice. D. Lehane, C. M. S. Kwantes, M. G. Upward, D. R. Thomson: British Medical Journal, **2**, 572-574 (Sept. 1949).

This article gives the results of a survey at the Liverpool Regional Blood Transfusion Centre on 5,973 people receiving transfusions of whole blood, large-pool plasma, or small-pool plasma. Large-pool plasma is derived from not less than 300 donors. Small-pool plasma is derived from not more than 10 donors.

Large-pool plasma, and combined large-pool plasma and blood transfusions were responsible for 75% of the resulting cases of homologous serum jaundice. The incidence rates for small-pool plasma and for whole blood were not significantly different, but were both much less than that of large-pool plasma. This justifies the recommendation to use small-pool plasma.

It was also suggested that at least 0.35% of donors are probably carriers of the icterogenic virus.

D. A. Smith

Effects of Cortisone Acetate on Rheumatoid Arthritis. E. W. Boland and N. E. Headley: Journal of the American Medical Association **141**: 301-308 (October, 1949).

Treatment of a series of 5 patients with severe and 3 cases with mild or moderate rheumatoid arthritis with cortisone acetate is described. Severe cases with one exception were given an initial dose of 300 mg. of the drug intramuscularly followed by 100 mg. daily for eight days. In three cases, spectacular improvement in objective and subjective symptoms was noted in a matter of hours. Two cases showed less rapid but still marked improvement. Sedimentation rates were lowered and secondary anaemias improved. A remarkable effect was a euphoria which the authors could not ascribe completely to relief of pain. Discontinuation of the drug resulted in rapid exacerbation of the disease although the most severely affected patient still showed 75% improvement two months after withdrawal of cortisone.

Two patients with moderate and one with mild rheumatoid arthritis were given 50 mg. of cortisone daily until clinical manifestations and sedimentation rates had subsided almost to normal and maintained thereafter on 50 mg. every other day. The results suggested a daily dosage of 50 mg. might be sufficient to control these patients.

D. I. Gove

The Use of Large Doses of Progesterone in the Treatment of Rheumatoid Arthritis. N. E. Reich: American Practitioner **4**, 1-5 (September, 1949).

The author describes the treatment of 21 cases of moderately and far advanced cases of rheumatoid arthritis with 50 mg. of progesterone in oil intramuscularly each day for 30 days. Some patients were then maintained on 10 mg. tablets in buccal absorption form daily for two to four weeks. There were 10 males and 11 females in the series. The average age was 45 years.

In judging results greatest weight was placed on objective improvement. In this series, excellent results were obtained in 2 males and 2 females; moderate improvement was noted in 4 males and 3 females. The remaining 10 patients showed slight or no improvement.

Moderate elevation of the erythrocyte sedimentation rate was noted in all but two patients. Twelve cases showed a distinct rise in blood cholesterol during therapy.

The author mentions evidence which may indicate that progesterone is converted to compound E (Cortisone) in small amounts in the body.

D. I. Gove

PHYSIOLOGY

The Mechanism of Petechial Hemorrhage Formation. J. G. Humble: Blood **4**, 69-75 (Jan. 1949).

The formation of petechiae by the tourniquet test (capillary resistance test) in the skin of 17 patients suffering from various haemorrhagic diseases was studied by capillary microscopy. It was found that petechial haemorrhages form, irrespective of the type of disease, at the arteriolar end of the capillary loop, this being the site of highest intracapillary pressure and the point where fluids normally leave the vessel for the tissues. Here also the highly constricted pre-

capillary arteriole dilates suddenly to form the capillary loop. The author postulates that a selective poisoning of this arteriolar-capillary junction could produce many types of haemorrhagic syndromes.

G. L. Ralph

The Production of Anti-Adrenocorticotrophin. Jeanne H. Chase, Endocrinology **45**: 96-107 (July, 1949).

In this paper an account is given of the experimental production of antibodies toward ACTH (Adrenocorticotrophic hormone). There is considerable evidence to indicate that antibodies or antihormones are produced when pituitary hormones are administered parenterally. This is true particularly of gonadotrophic and thyrotrophic preparations.

The ACTH preparation employed to elicit antibody formation behaved as a single component in the ultracentrifuge and Tiselius apparatus. Antiserum was prepared by injecting 50 mg. of this pure material into two groups of mice over a 25 day period. One group was injected subcutaneously, the other intraperitoneally.

A biological assay of the antiserum was performed by observing the difference in the weight of rat adrenal glands following the injection of pure ACTH and ACTH plus antiserum. ACTH alone caused the adrenal weight to rise 77.2 mg/100 Gms. body weight. Simultaneous administration of mouse antiserum reduced the weight to 36.3 mgs. Control glands weighed 35.5 mgs.

A serological assay of the antiserum was also performed. The antiserum was tested by mixing it with a suspension of an ACTH collodion complex or a saline solution of the purified hormone. A precipitate indicated a positive reaction. The most potent antiserum was obtained 10 days after the last injection of ACTH. Subcutaneous injection was most effective in eliciting a response. When biologically tested, the supernatants from the serological reactions produced no increase in rat adrenal weight. Injection of mouse antiserum alone caused a 30% decrease. Thus there is a definite correlation between the serological and biological activity of the antiserum.

This paper is of interest when considering the side effects of prolonged ACTH therapy.

J. S. Speakman

PSYCHIATRY

Unilateral Prefontal Lobotomy for the relief of Intractable Pain and Termination of Narcotic Addition. John E. Scarff, Surgery, Gynecology and Obstetrics. **89**: 385-392, (October, 1949).

The results of unilateral prefrontal lobotomy performed for the relief of intractable pain in a series of 33 patients are discussed. The results are good in 66 per cent, fair in 18 per cent and poor in 15 per cent, with arbitrary standards for these categories as follows: "good" means no voluntary complaint of pain or need for narcotics after the operation. "Fair" means continuation of some pain post-operative but requiring far less medication. "Poor" means that the same degree of pain and the same amount of narcotic requirement were present after operation as before.

The pathological processes and their sites in the 3 different categories were equally varied and the follow-up periods were about the same, the average being 2½ months.

A standard technique was used throughout the series, lobotomy being performed under direct vision in a plane passing just anterior to the tip of the lateral ventricle and carried laterally, medially and ventrally until grey matter is everywhere encountered. Almost all of the patients were out of bed by the end of the third post-operative day.

In 15 patients of this series having careful psychometric evaluations before and after lobotomy, no significant impairment of intellect or personality could be found.

In 15 of 16 patients heavily addicted to narcotics because of pain prior to operation, abrupt termination of the narcotic was effected immediately after operation without withdrawal symptoms.

W. J. D. Cooke

Prefrontal Operations for the Treatment of Mental Illnesses. J. Lawrence Pool, Annals of Internal Medicine. **31**: 424-427 (Sept. 1949).

The relative values of different types of prefrontal operations for the treatment of mental illness are discussed. Of the two main classes of operation: 1. those involving interruption of the white matter (lobotomy or leucotomy) and 2. those involving the resection of cortical gray matter (subtotal cortical ablation; frontal gyrectomy; topectomy) the latter class is considered to be preferable by the author because in those operations there is less frontal lobe function sacrificed and hence fewer post-operative effects such as permanent incontinence and profound blunting of the personality.

The aim in these operations is to benefit mental disturbances principally by reducing anxiety, tension and excess emotional charge which is believed to be accomplished by interruption of thalamo-cortical circuits by disconnection or removal of cortex in the region of areas 9, 10 and 46 of Brodmann, which are important stations for thalamic projections from the dorsomedial thalamic nuclei. Operations to be effective must be bilateral.

In the author's series of 100 topectomies the mortality rate was 0. Post-operative complications consisted of 16% incidence of occasional convulsive seizures, a rare post-operative haematoma (treated successfully by reoperation) and temporary urinary incontinence in some cases.

In selection of patients, those without previous adequate attempts at psychotherapy or shock therapy should not be considered and the most conservative type of operative procedure is selected for each individual case, as a more radical procedure can always be done later if necessary. Good results in schizophrenics are obtained in 20% of cases; fairly good results in another 20% or more. Most cases in the obsessive-compulsive group and the involuntional type of depression are greatly improved, while the psychopathic personality group improve least.

W. J. D. Cooke

Myxoedematous Madness. R. Asher, British Medical Journal, **2**: 555-562 (Sept. 1949).

Myxoedema was found to be a much commoner cause of organic psychosis than is usually believed. The author described fourteen cases, all of whom were given thyroid extract (0.5-3 grains, three times daily). Nine cases recovered completely, two recovered partially, one showed no change and two were fatal.

There was no specific psychosis although delusions and hallucinations were present in one half the cases. Diagnoses had been missed because of the lack of presence of classical features of the disease.

An account of deviations from the classical findings and methods of diagnosing the condition are reviewed. The author has found that the photographs of before and after treatment give the best confirmation of the diagnosis.

E. Toguri

Psychologic Factors in the Etiology and Treatment of Chronic Headache: C. Brenner, A. P. Friedman, S. Carter. Psychosomatic Medicine **11**, 53-56 (Jan.-Feb. 1948).

A frequent cause of chronic headache in several hundred cases was found to be suppressed anger or resentment against dominant relatives or superiors. Other important causes were hysterical transformations of guilt feelings, hypochondriacal symptoms preceding a psychosis and strongly resembling psychoneuroses and swinging the lead for psychoneurotic or financial gain. The authors give several good short case histories.

Treatment is complicated by the necessity of gaining rapport and getting unwilling patients to accept psychotherapy. Confidence is gained by a complete inquiry and physical examination, followed by reassurance that there is no organic disease. Following this numerous interviews are often necessary. Frequently a placebo helps, and is often essential. Often the physician finds himself in the position of a benevolent parent. In these cases reduction of the frequency of visits may result in return of symptoms. Frequently the airing of conflicts is adequate, sometimes domestic rearrangement is required.

D. J. Lewis

The Ceiling Effect of Glutamic Acid upon Intelligence in Children and in Adolescents. F. T. Zimmerman, B.B. Burgemeister, T. J. Putnam: Am. J. Psychiat. **104**, 593-599 (Apr. 1948).

The experimental group consisted of 23 mentally retarded children and adolescents, of whom 7 suffered from convulsions, and 7 convulsive subjects without mental retardation. After one year of glutamic acid therapy (2 to 8 Gms. t. i. d.) these 30 subjects were compared with a control group of 37 mentally retarded patients, with and without convulsive disorders, on the basis of the Stanford-Binet test, the Arthur Point Scale and the Rorschach Test. The average I.Q. gain of the experimental group in the first six months was 8.67 points with a total gain at the end of the year of 10.87 points. This rate of gain is twice that expected of children of average intelligence. However, the decrease in the rate of gain in the second six months of therapy suggests the intelligence test scores rapidly approach a ceiling. Further studies are necessary to determine whether, when the ceiling is reached, a normal rate of gain will be maintained or whether the rate will recede to pretherapeutic levels.

A. C. Parkin

NEWS AND NOTES

Medical Society

This is the time of year when Daffydil is first on the list of Medical extracurricular activities. Arrangements for the 1949 show are now practically completed. Year skits, dance routines, and feature numbers are all in rehearsal, and have been for some time. Walt Prendergast, John Harkins, and Gord Cameron are the top three in charge of production. New ideas, original music, experience, and enthusiasm are combining to make this year's Daffydil the best yet. The show is being presented at the Hart House Theatre, December 12 to 15. An increased number of tickets has been made available to undergraduates. These are being distributed on a per capita basis to all classes, assuring a fair distribution to the whole faculty.

* * *

The Medical Arts and Letters Club has been encouraged by the big turnouts to the very worthwhile meetings which have already been held this year. Early in October, Dr. J. C. Callaghan spoke of his experiences in the North country. Later in the month, Dr. L. J. Rogers gave an interesting address on his work as Provincial Analyst. The Medical Society has increased the Arts and Letters Club operating budget. Plans are now being made for a Medical Jazz Concert, and for an evening of folk music.

* * *

The Meds At-Home Committee reports that a theme has been chosen for this year's dance, which is being held February 15, at the Royal York Hotel. The emphasis is to be placed on the international aspect of medicine. Decorations and entertainment have been arranged to fit in with the theme. Lounging facilities will be a feature of this year's At-Home.

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A Medical Year Book is being planned this year, which will provide individual photographs of each undergraduate, a pictorial record of the year's activities, and a coverage of news items pertinent to the staff. A limited number of copies, based on the number of subscriptions received, will be printed. If you have not yet ordered your copy, please contact some member of the Medical Society Executive, and do so at once.

* * *

McGill and Varsity undergraduates alike agreed that Panacea, Meds big evening at Hart House, November 4, was very successful in every way. The Medical Society, encouraged by the comments of those who attended, has decided to continue Panacea as a yearly event. Everything from square dancing and swimming pool displays to classical music was provided; a great deal of credit is due Roy Rowsell, Dave Storey, and the many Committees concerned, for a wonderful evening of entertainment. Tuck shop receipts for the evening, were turned over, by the Medical Society, to I.S.S.

* * *

The appointment has been announced of Dr. Hardolph Wasteneys as Honourary Secretary-Treasurer of the Medical Society.

Camsi

The thirteenth annual Camsi convention was held this year at London, Ontario, October 20 to 22 inclusive. Peter Heaton, Bruce Buchanan, and Fred Moffat represented the University of Toronto and report that a good deal was accomplished at the meetings. The officers proposed by the University of Montreal were elected to this year's National Executive.

Many improvements are planned for the Camsi Journal. The Journal, which has subsisted on advertising revenue alone in the past, has been subsidized to the extent of $500. The editorial staff has been more closely co-ordinated. Arrangements have been made to include Camsi news, news from member schools, and a bulletin from the National Executive, in each future issue. An effort will be made to assure publication of the Journal on time. Plans were also made for an annual competition, beginning this year, among member medical school undergraduate journals.

Subject to ratification by individual member schools, it was decided at the convention to affiliate Camsi with the British Medical Student's Association.

* * *

At the Art Salon, held in conjunction with the convention, the names of University of Toronto medical undergraduates were prominent on the award lists. In the oils exhibit, first prize went to D. G. Watson, Meds 5T2; second prize to R. R. Tasker, Meds 5T2. D. C. Harrison, Meds 5T0 won first prize in the Water Colours class. First prize in the miscellaneous art group went to A. J. Weir of Meds 5T0, and

R. J. Angus, Meds 5T2, won second prize for photography.

Faculty

President Smith has recently released a list of Medical Faculty changes which includes the appointments of Dr. R. E. Haist as a Professor of Physiology, and Dr. Frieda H. Fraser as a Professor of Hygiene and Preventive Medicine. The list also includes the appointments of Dr. W. H. Brown, and Dr. H. H Hyland as Associate Professors of Medicine, Dr. J. L. McDonald as Associate Professor of Surgery; Dr. C. L. Ash as Assistant Professor of Radiology, Dr. E. S. Goranson as Assistant Professor of Physiology, and Dr. F. G. Kergin as Assistant Professor of Surgery.

* * *

In honour of the late Dr. Helen L. Vanderveer, an anonymous donor has increased a graduate medical fellowship for the furtherance of pathological research. Last year, Dr. Vanderveer's will provided a $50,000 fellowship for the establishment of a fund for such research. A further $50,000 has been added to this sum by the anonymous donor.

* * *

Dean MacFarlane has announced that, beginning this year, University of Toronto medical undergraduates are eligible for loans of up to $400 under the terms of the Kellogg Foundation Loan Fund. Details can be secured from the Dean's office.

* * *

Arrangements are now being made for special interneships designed to prepare doctors for general practice. These interneships will be limited to three in number for the hospital year beginning July 1, 1950. The programme includes four months in Paediatrics at the Hospital for Sick Children, four months in Obstetrics and Gynaecology at the Toronto General Hospital, and four months in Medicine at the Toronto General Hospital, Wellesley Division. These interneships are being offered to doctors who have completed at least one year on a rotation interneship. Applications should be made immediately to Dr. R. B. Kerr, Department of Therapeutics, Banting Institute.

* * *

Among recent visitors to the University Medical School was Sir James Learmont, Professor of Surgery, University of Edinburgh, Surgeon to His Majesty the King, who delivered the Donald Balfour Lecture, October 12. Sir James' topic was "Thrombosis and Embolism of the Aortic Bifurcation". Lord Alfred Webb-Johnston, Immediate Past-President of the Royal College of Surgeons, England, was awarded an LL.D. at this year's fall convocation. Dr. Johan Holst, Professor of Surgery, University of Oslo, was another recent visitor to the University. Dr. Holst gave an interesting lecture on "Carcinoma of the Stomach" to students of the final year, October 26. During the first week in November, one Finnish and fifteen Swedish surgeons, on their way home from a tour in the United States, spent several days at the University of Toronto Medical School.

Alumni

The Medical Alumni Association Refresher Course, held at Sunnybrook Hospital, October 27 to 29, was very successful, both from the point of view of the course itself, and from the point of view of the number in attendance. Appreciation is expressed to the University Faculty for making the course possible by giving so generously of their time.

* * *

The All-Varsity Home-Coming Weekend, in conjunction with which the post-graduate course was held, was a huge success too. Miss Peg Dewan and her cohorts deserve much credit for the very effective, and very colourful, float which represented Medicine in the Saturday morning Home-Coming parade.

* * *

The annual meeting of the Alumni Association was held Friday noon, October 28. Reports from the various committees indicated a very successful year. An attempt is being made to add further to the generous list of Alumni scholarships and bursaries, already available to University of Toronto medical undergraduates.

* * *

The Medical Alumni Association held Open House in the Medical Building on Sunday, October 30, between 4 and 6 p.m.

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The cost of medication, of course, is but one item in the total cost of illness, the greatest expense stemming from the length of incapacitation and consequent loss of working time. One distinct advantage of CHLOROMYCETIN therapy is its fundamental economy—quick clinical response, reduced morbidity, shortened convalescence and earlier return of the patient to his job.

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Directions—One to two capsules three or four times a day.

Quick Acting

Pentobarbital is an excellent, quick-acting barbiturate of relatively brief duration. Therefore, it has an advantage where quick action is desired. Pentobarbital is destroyed in the liver and little, if any, can be recovered from the urine when administered in sedative doses. Therefore, when liver function is poor, the action of the drug will be prolonged.

Long Duration

Phenobarbital, a long-acting barbiturate, is combined with pentobarbital to prolong the sedative and hypnotic effect. Phenobarbital is mainly removed from the body by the kidneys. In the presence of poor kidney function its action will be prolonged. Barbiturates should be given with caution where hepatic or renal disease is present. The action of barbiturates is markedly potentiated by alcohol.

Indications

Sedative in nervous conditions, worry, mild delirium, alcoholism, exophthalmic goitre, hypertension and menopause; hypnotic, motor depressant; nausea and vomiting in seasickness, pregnancy, vertigo and migraine.

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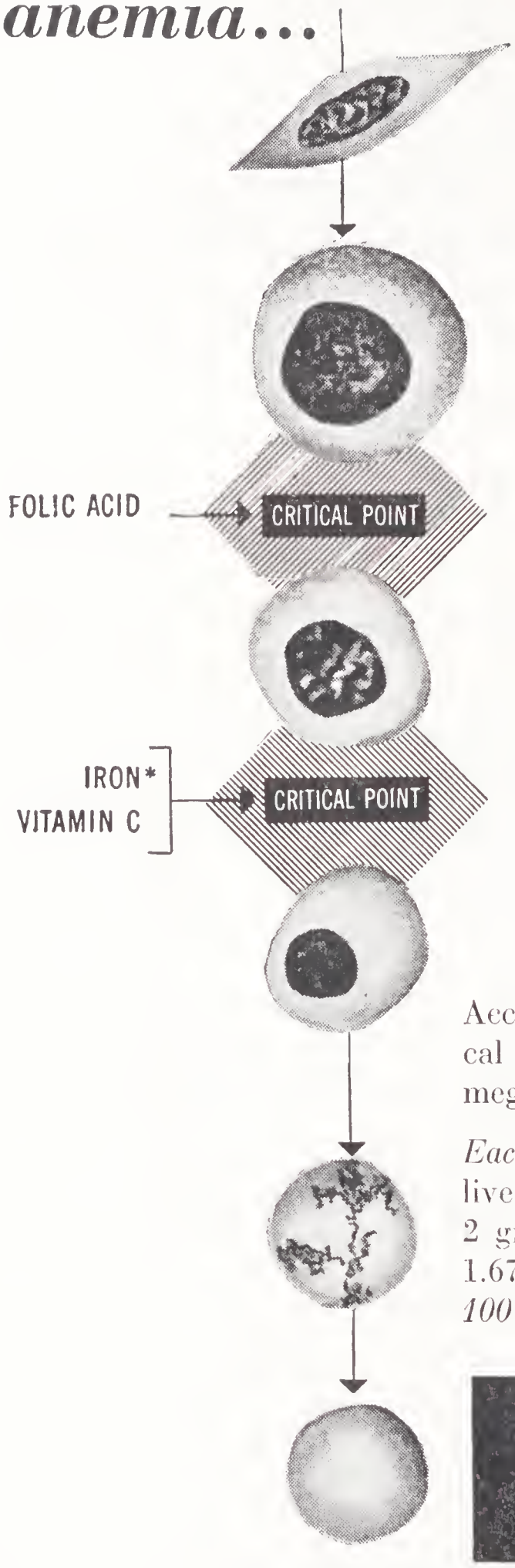

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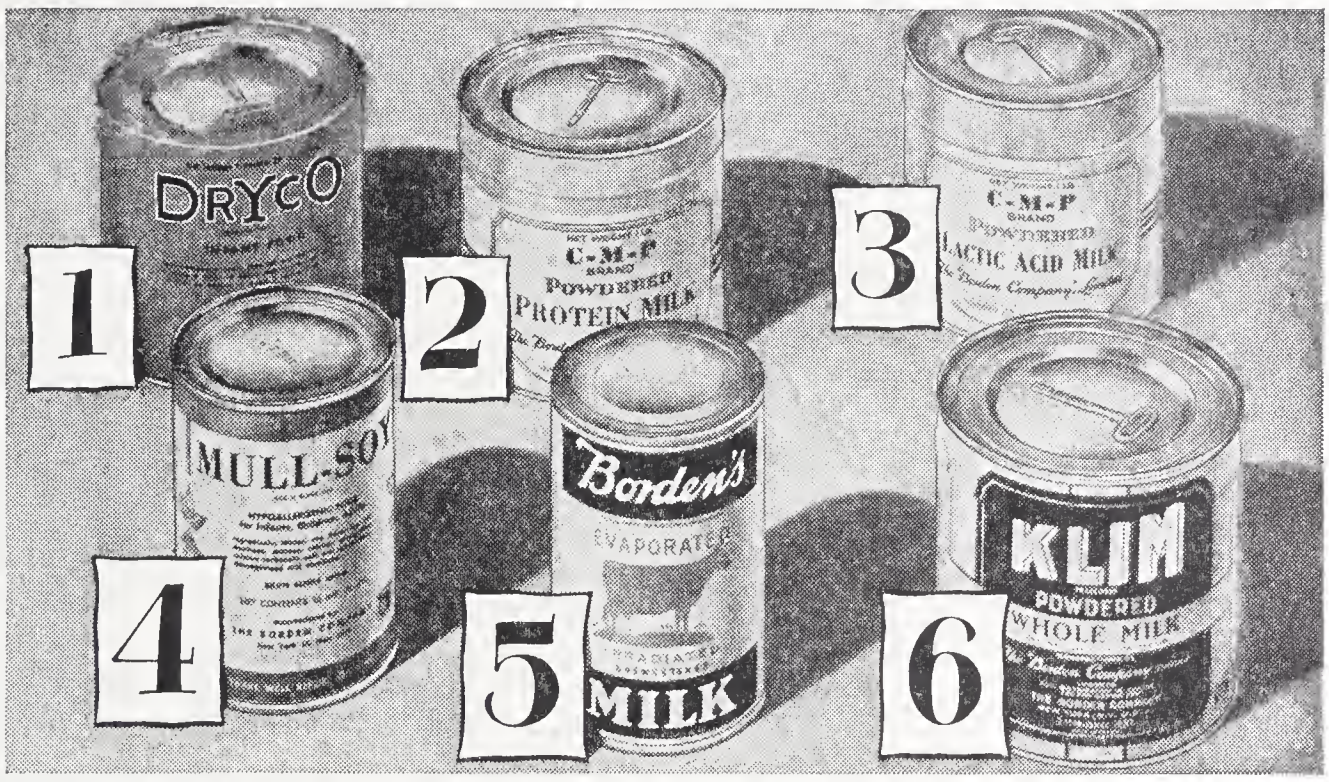

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3 C.M.P. LACTIC ACID MILK . . . is spray-dried pasteurized milk inoculated with a culture of lactic acid bacilli and incubated to a definite acidity.

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4 MULL-SOY . . . an emulsified soy bean food used as a replacement for milk in cases of milk allergy in infants, children and adults. It is palatable, well-tolerated and easy to digest.

Mull-Soy diluted with equal volume of water contains all the essential nutritional properties of average cow's milk.

5 BORDEN'S EVAPORATED MILK . . . a pure, fresh whole milk evaporated to double concentration, and homogenized for extra smoothness and ease of digestion in infant feeding formulas. Vitamin D increased.

6 KLIM . . . spray-dried, powdered milk containing all the valuable nutritive qualities of fresh whole milk. A simple effective means of providing extra milk solids without increasing the total bulk of the diet.

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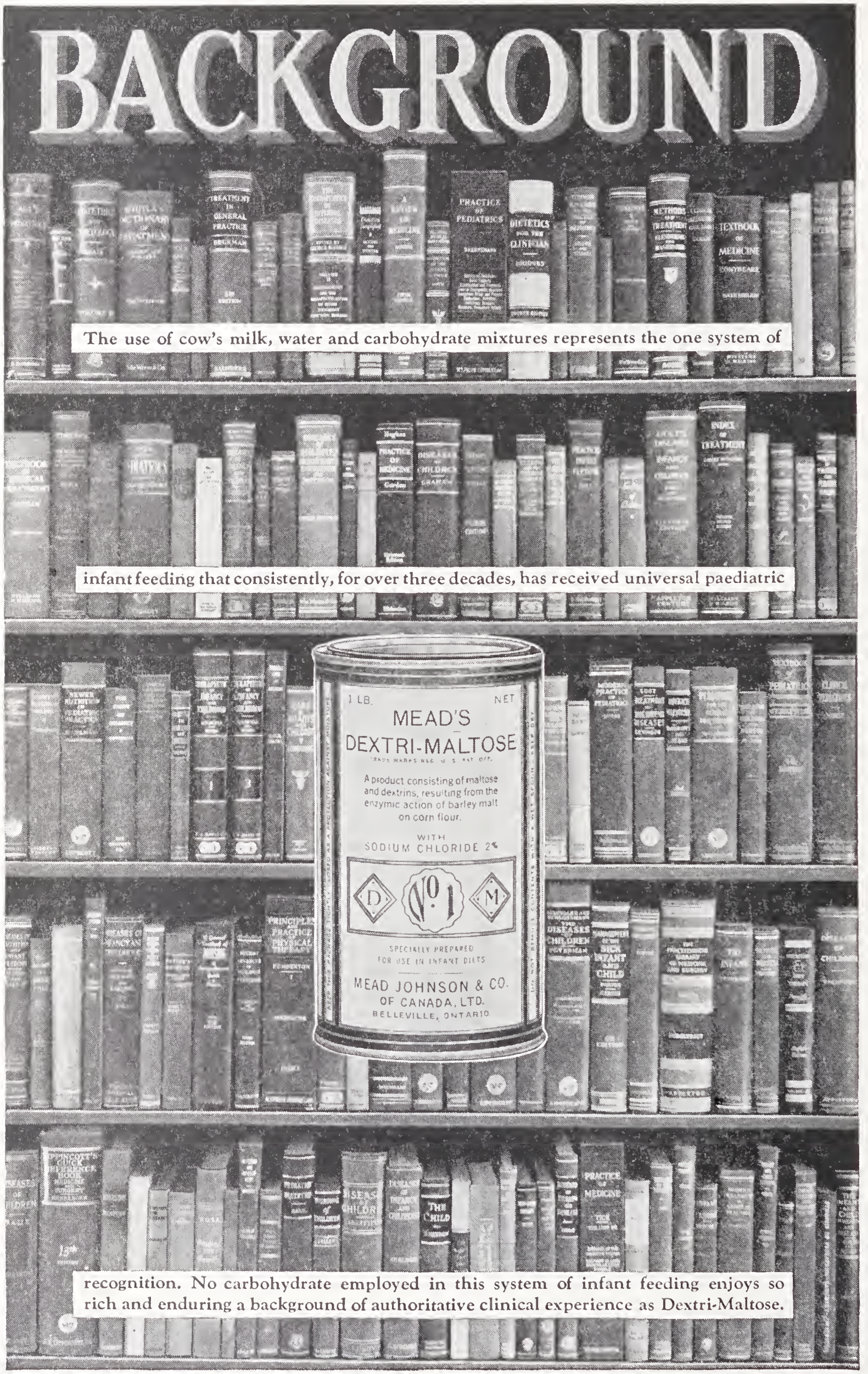

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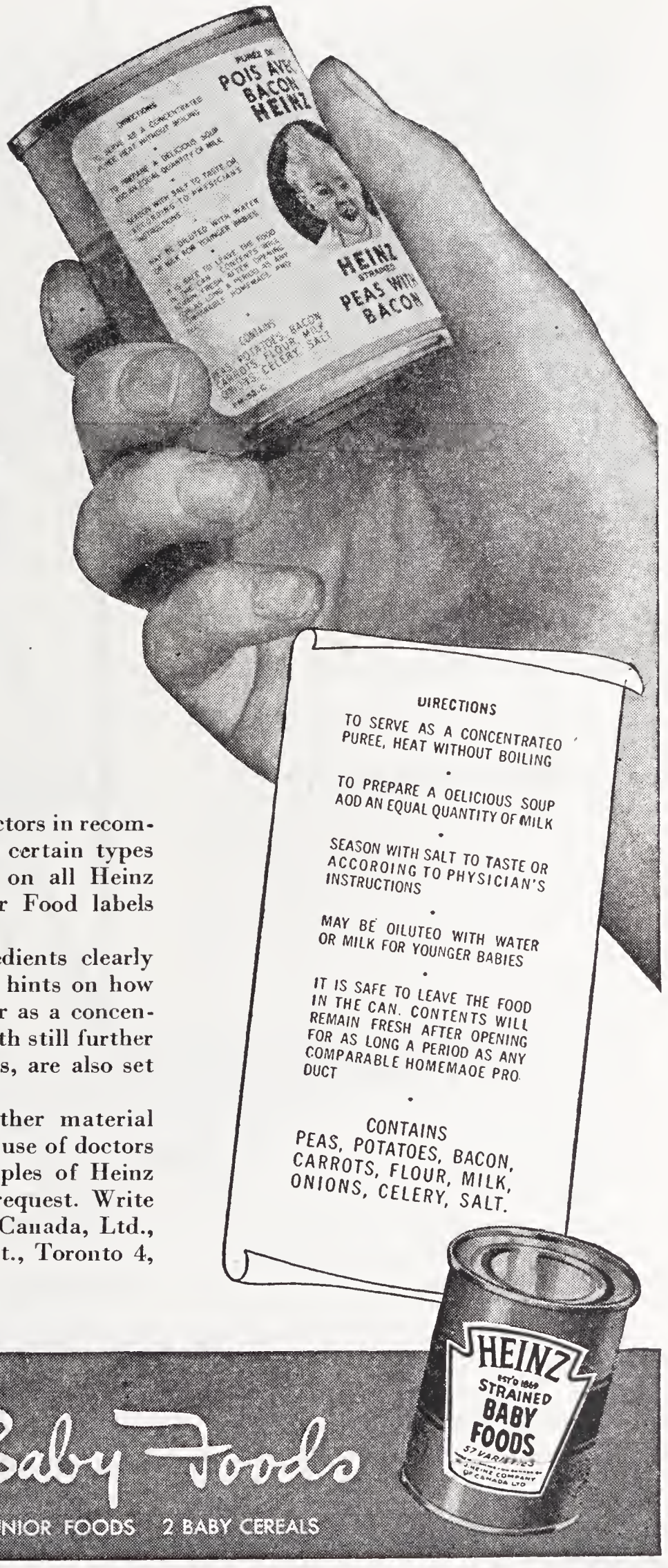
DIRECTIONS
TO SERVE AS A CONCENTRATED PUREE, HEAT WITHOUT BOILING
TO PREPARE A DELICIOUS SOUP ADD AN EQUAL QUANTITY OF MILK
SEASON WITH SALT TO TASTE OR ACCORDING TO PHYSICIAN'S INSTRUCTIONS
MAY BE DILUTED WITH WATER OR MILK FOR YOUNGER BABIES
IT IS SAFE TO LEAVE THE FOOD IN THE CAN. CONTENTS WILL REMAIN FRESH AFTER OPENING FOR AS LONG A PERIOD AS ANY COMPARABLE HOMEMADE PRODUCT
CONTAINS
PEAS, POTATOES, BACON, CARROTS, FLOUR, MILK, ONIONS, CELERY, SALT.
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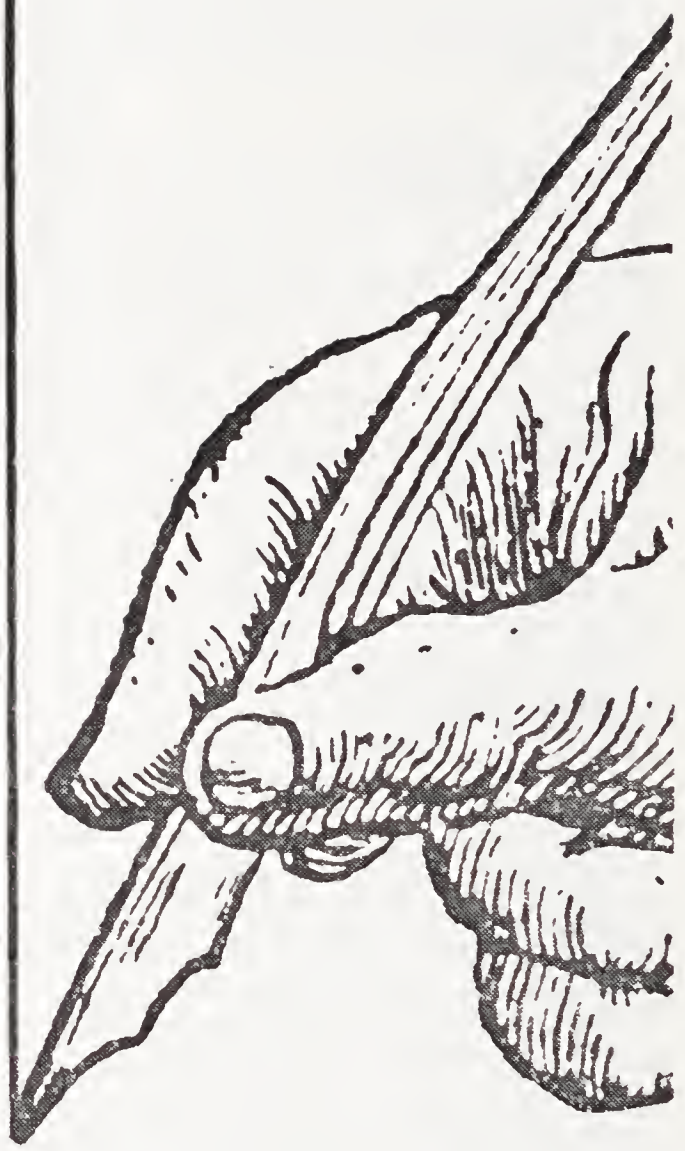

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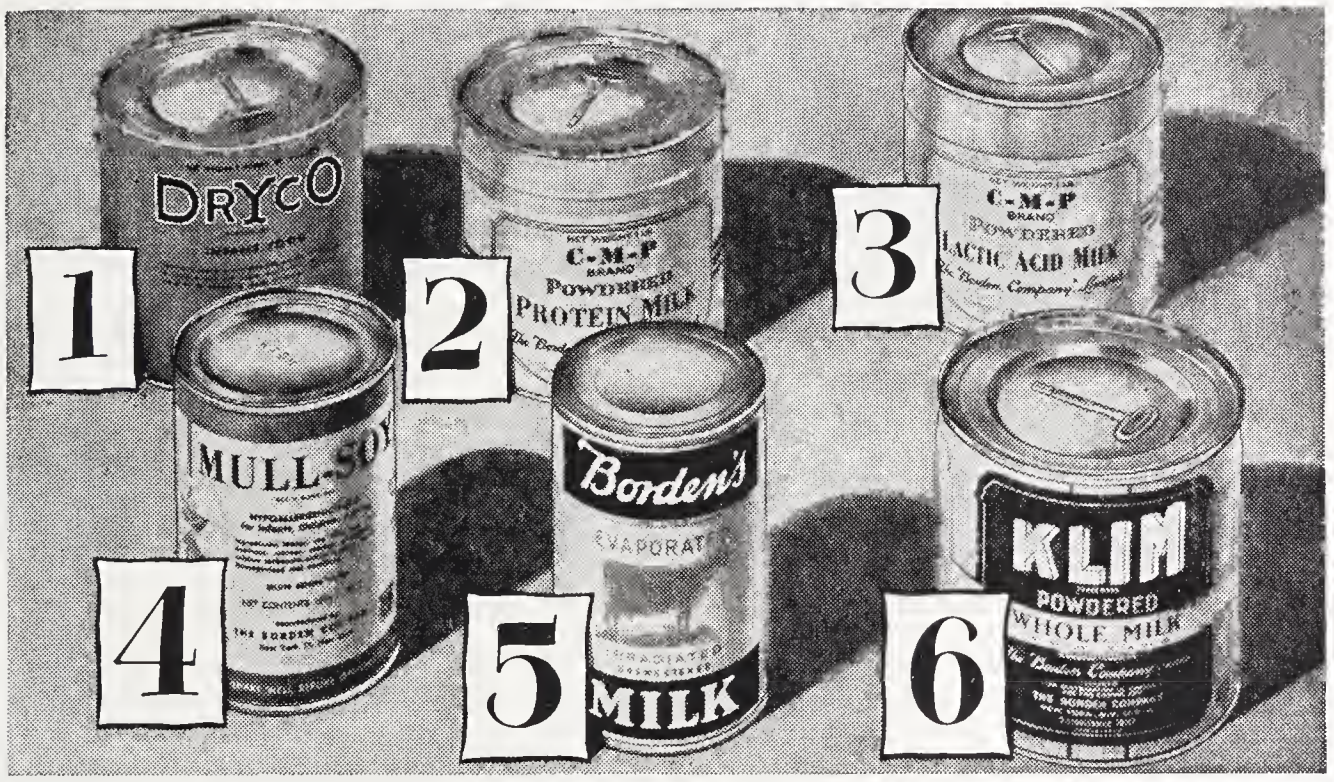

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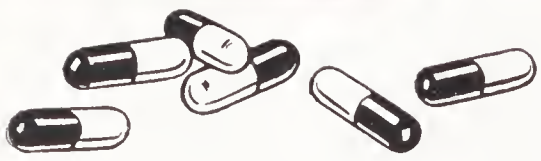

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